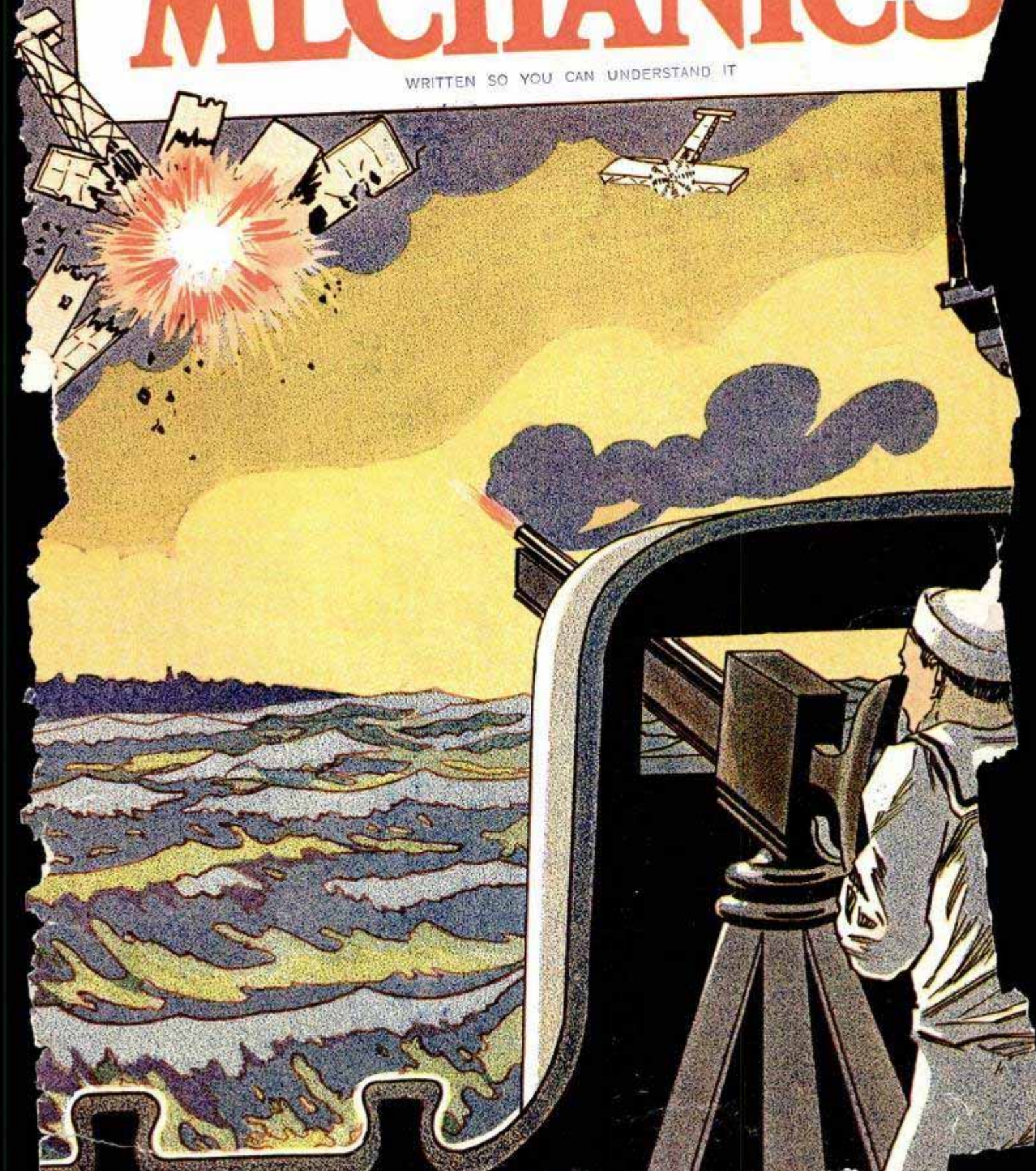


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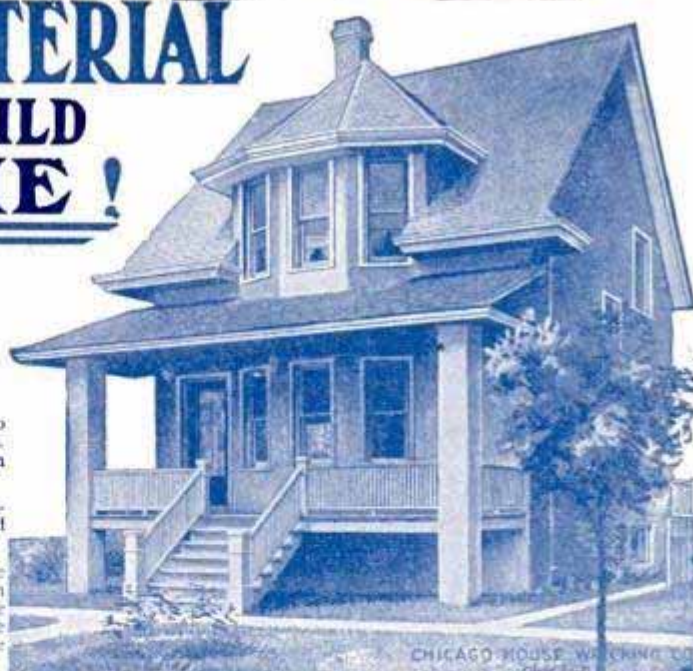
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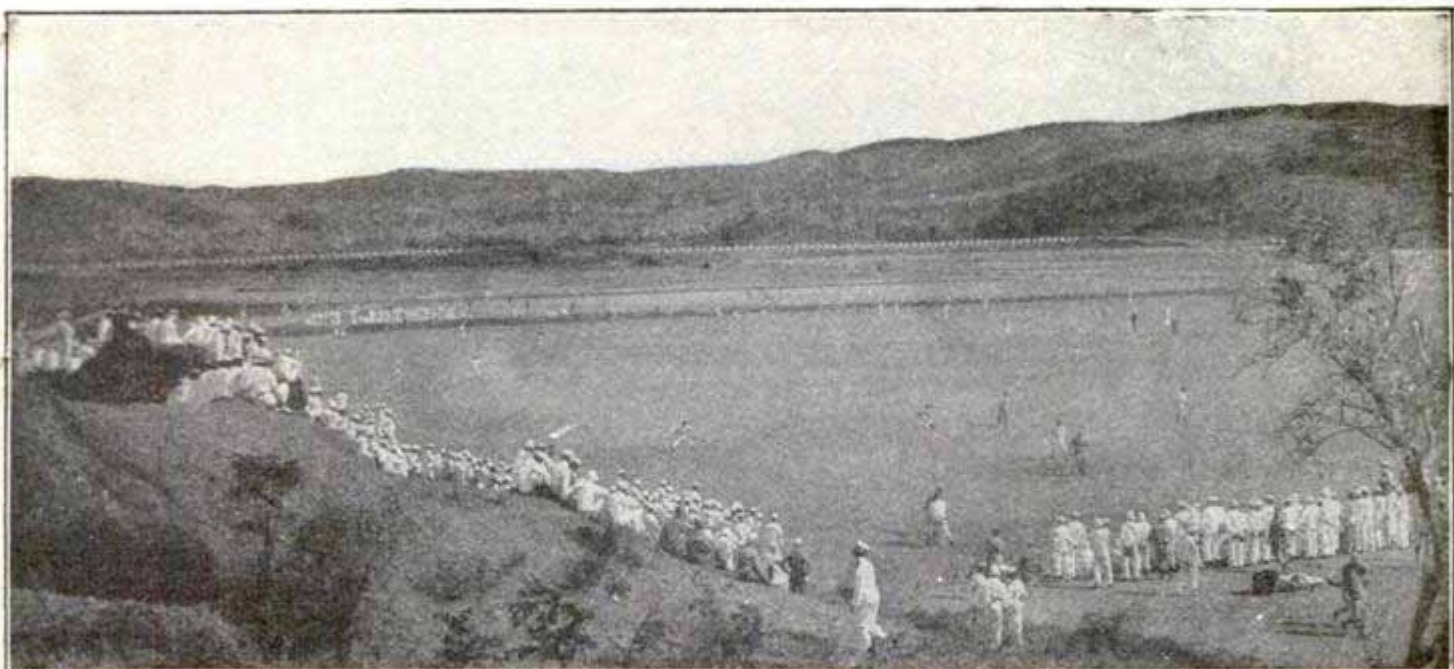
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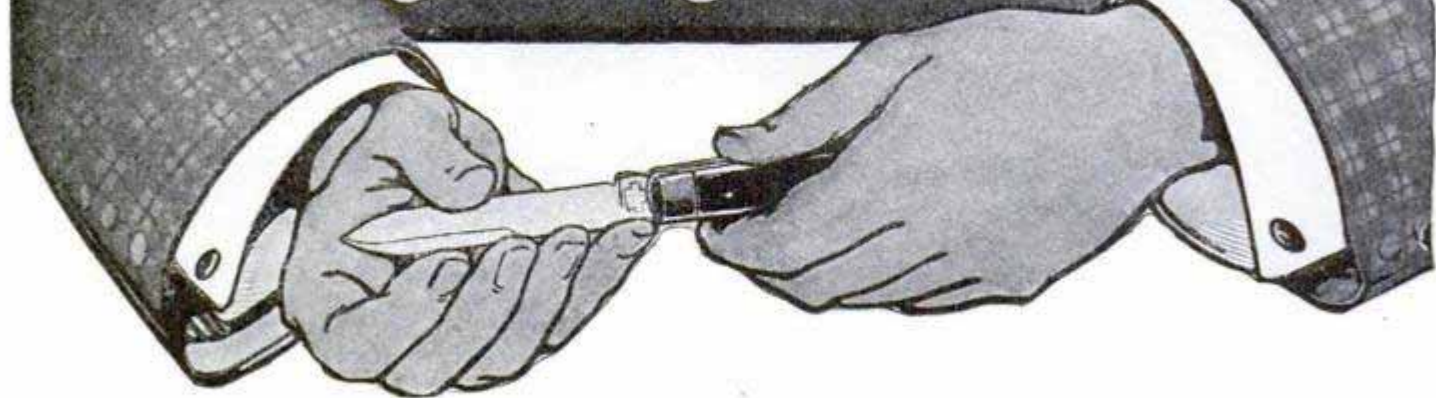
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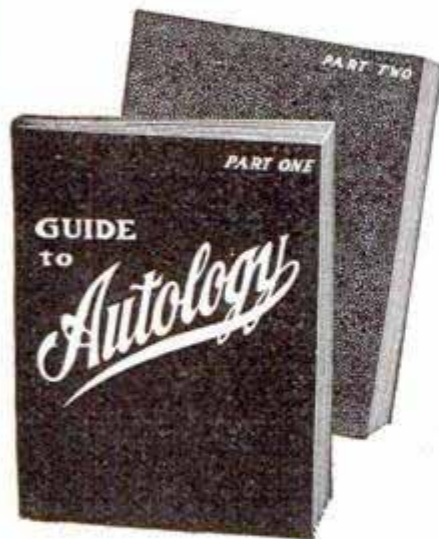
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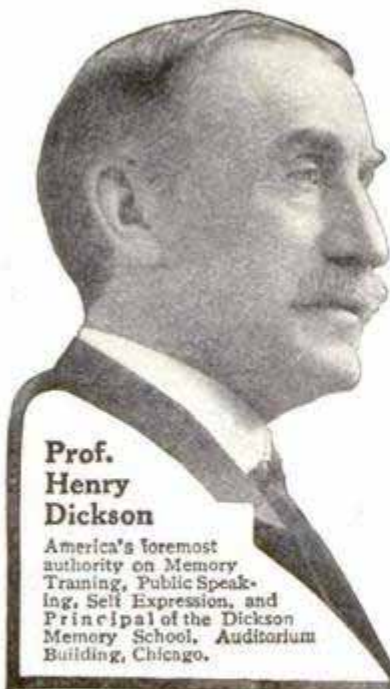
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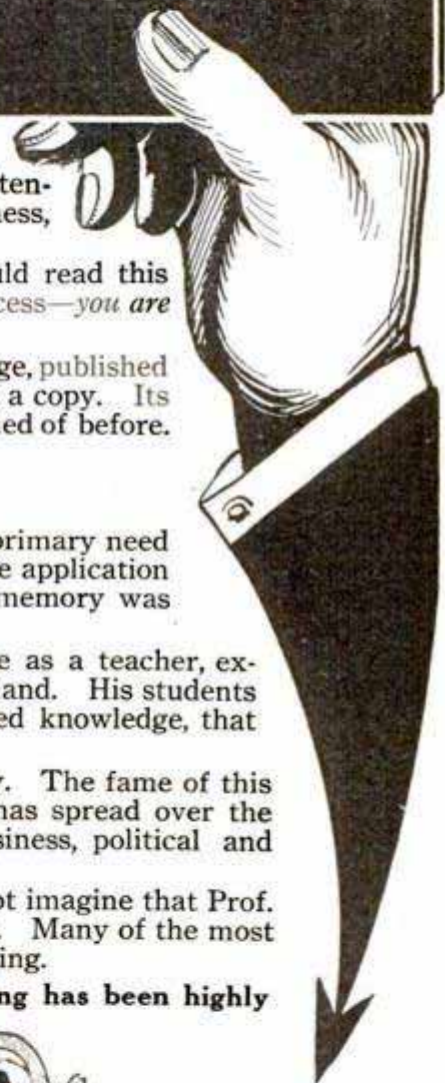
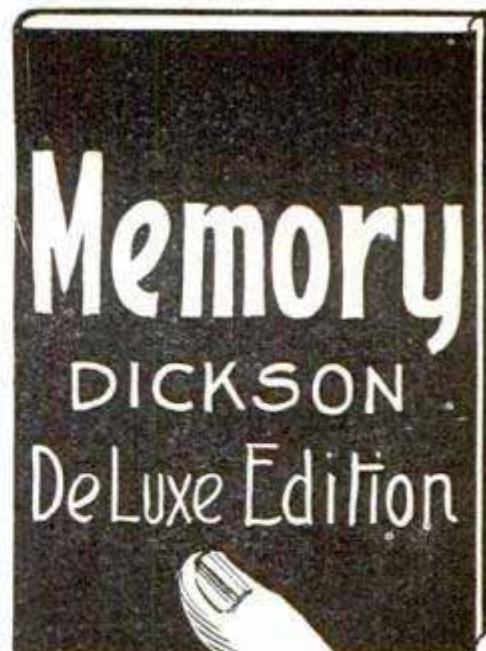
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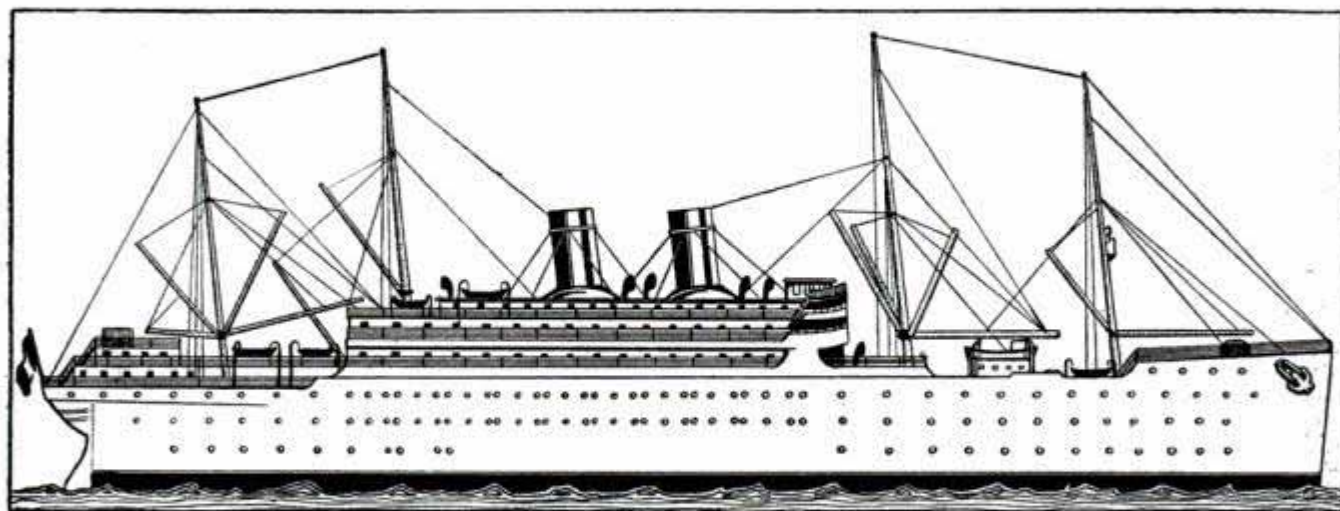
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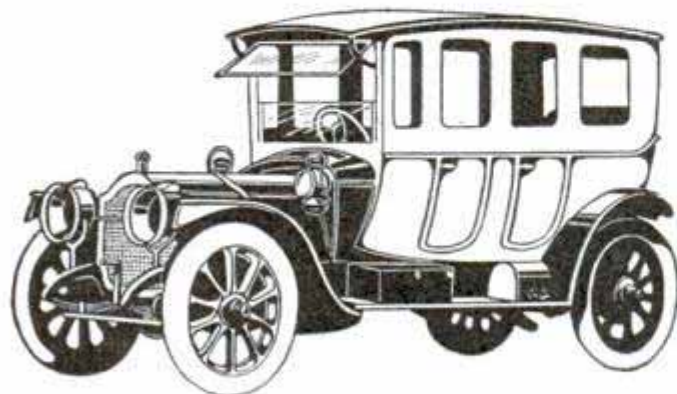
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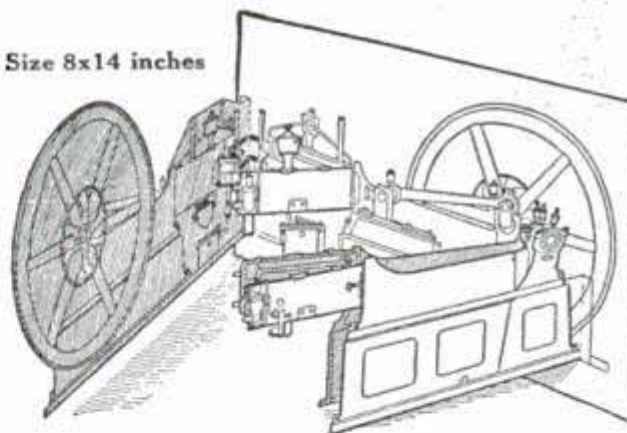


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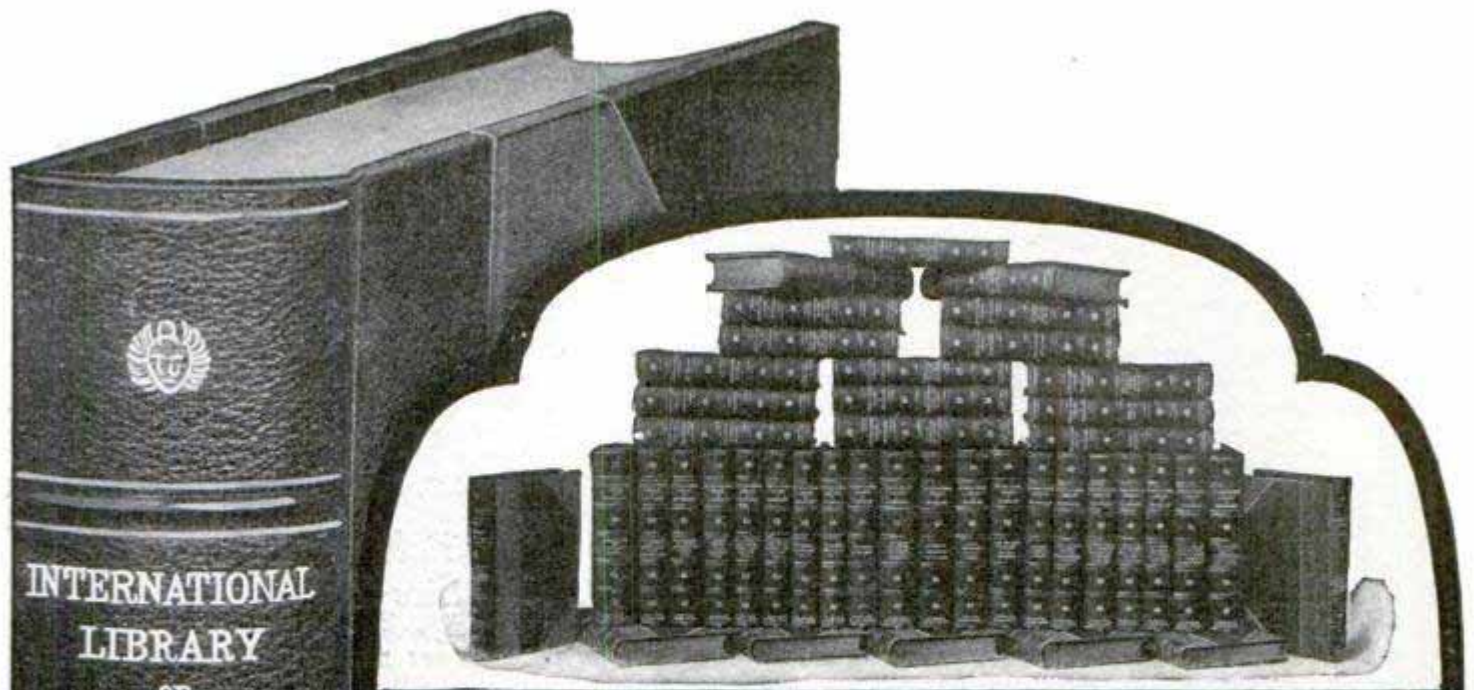
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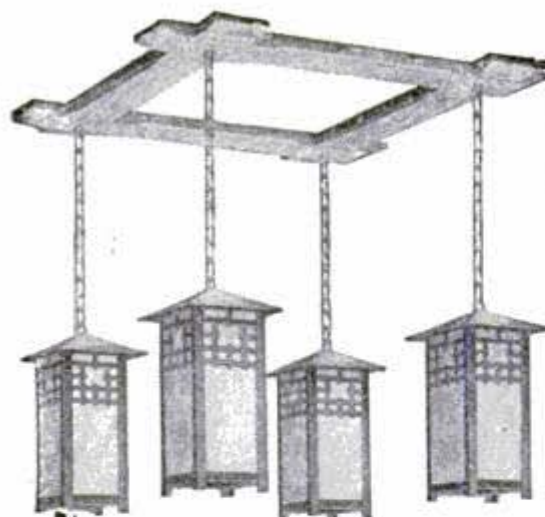
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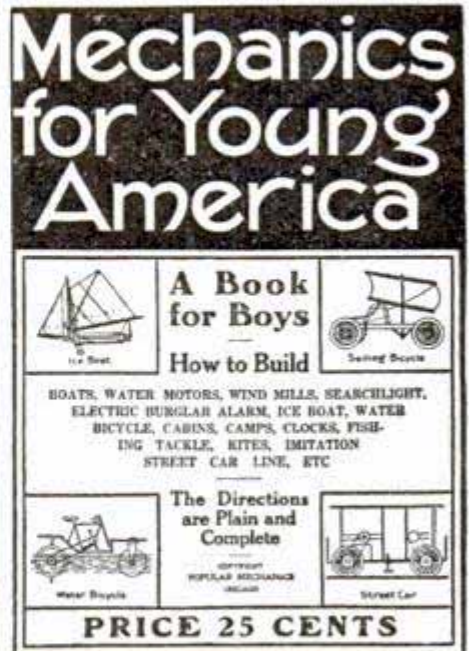
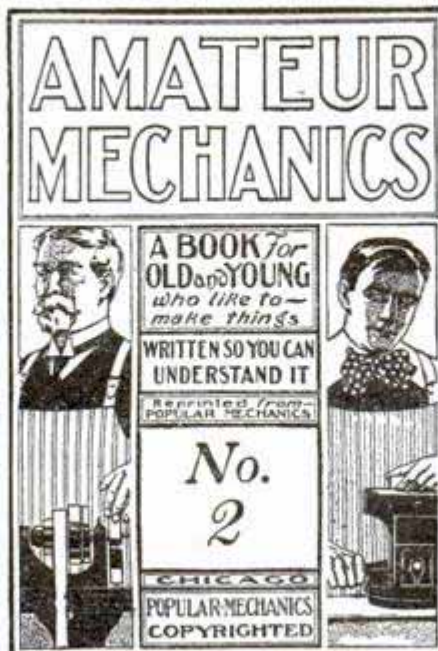
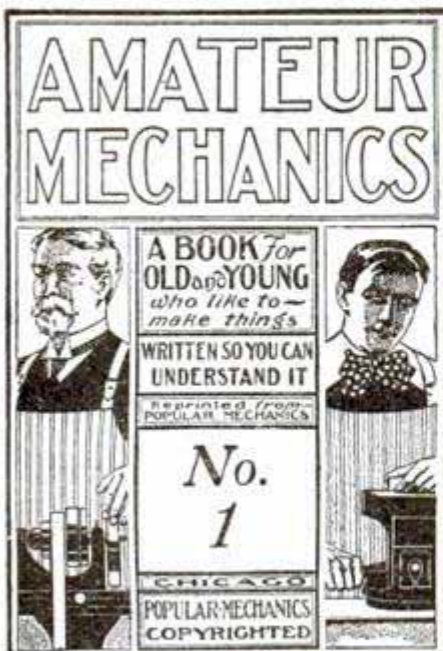
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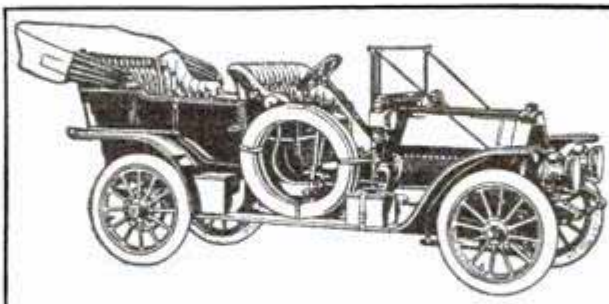
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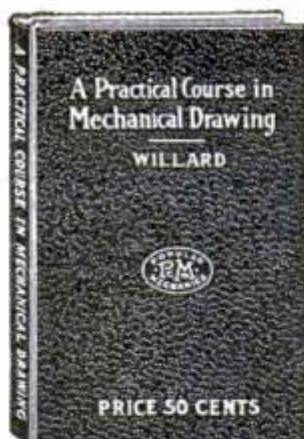
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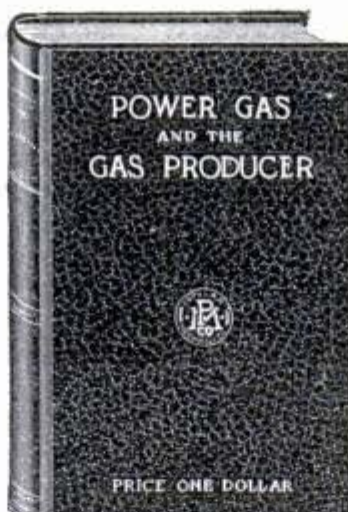
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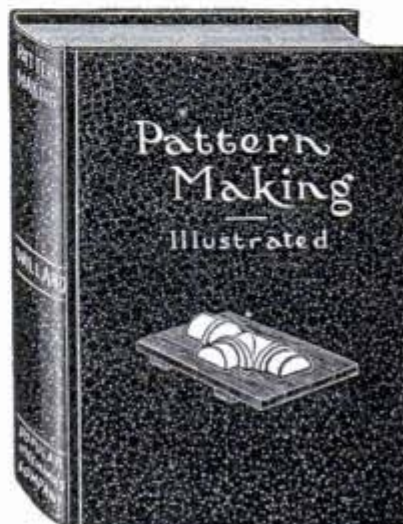
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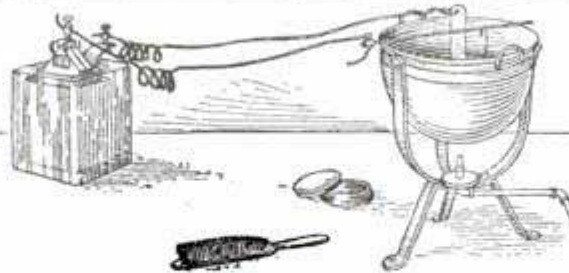
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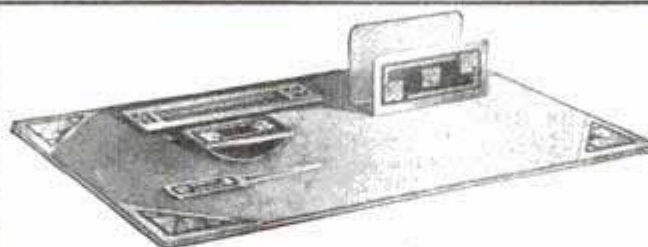
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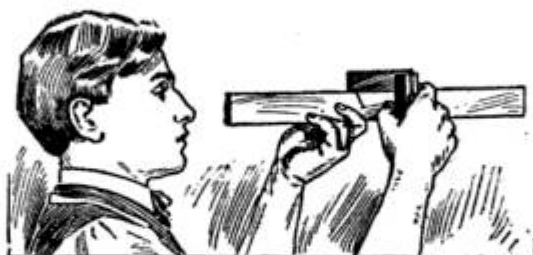
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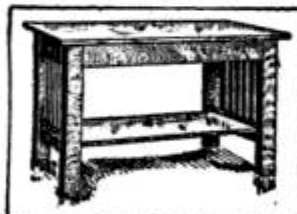
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ILL HEALTH NECESSITATES my retirement as secretary of mail-order house doing upwards \$300,000 per annum. Chance of a lifetime for right party with \$5,000 to \$10,000, with good prospects of larger investment if wanted. H. R. Taylor, Jr., Box 676, Los Angeles, Cal.

I MADE \$50,000 in five years with a small mail order business; began with \$5. Send for free booklet. Tells how. Heacock, Lockport, N. Y.

BIG 4 MONEY-MAKING mail order plans, copyrighted; requiring small capital. Circular free. Mail Order Company, Dorchester Center, Mass.

BIG PROFITS—Open a dyeing and cleaning establishment; very little capital needed. We teach a successful method by mail. Write for booklet. Ben-Vonde System, Dept. C, Charlotte, N. C.

LEARN THE TRUTH about Mail Order Business before buying "outfits." Important information and particulars for starting free. Mail Order Library, P. M. Tompkinsville, N. Y. City.

HAVE YOU ANYTHING TO ADVERTISE? Our Rate Book tells you all about advertising mediums, rates, circulation, closing dates, etc. Sent for 10c. Worth dollars. Folder free. Correspondence invited. Dearborn Advertising Agency, 455 Franklin Bldg., Chicago.

"WAY TO SUCCESS in the mail order business" tells how I made \$18,000 in three years. Worth dollars to you. Free on request. H. System, 107 Marion, Kentucky.

SIX NEW FORMULAS. Brand new. Not the old wornout kind, but something new and will make you money. 10 cents silver gets them. M. W. Rand, Box 224, Spokane, Wash.

WE ARE IN A POSITION to act as direct agents for manufacturers in West Australia. Highest banking references given. Address The Cyclone Fence Co., Ltd., 887 Hay st., Perth, West Australia.

START A HOME BUSINESS. Sell your ideas, formulas and knowledge by mail. Some make \$1,000 monthly. Instructive booklet for stamp. Information System, 252 Marietta, Ohio.

300 MONEY-MAKING FORMULAS, 10c. A. H. Smith, 414, 195 West Monroe St., Chicago.

DO YOU KNOW BOYS expecting to attend "prep" school? Have interesting, profitable plan for you for good names. Address, Roland Wilder, Morgan Park, Ill.

AGENTS. Mail Order Men 500 per cent profit. Local or Mail Order business. Sample, particulars 4c. Maryland Sales Co., Baltimore.

RAISE GINSENG—\$1 per square foot of ground. \$25,000 on 1/2 acre. Grows anywhere; 1/2 city lot a bonanza. 10c brings booklet. Sheboygan Ginseng Gardens, Sheboygan, Wis.

MAIL ORDER ADS THAT PAY. 20 different propositions fully explained. All bona-fide, sure-fire Money-getters. Each one the foundation of a successful Mail Order business. Send 10c for full particulars and regular bulletin of new propositions. Mail Dealers Wholesale House, 450 Franklin Bldg., Chicago, Ill.

START A BUSINESS of your own. Send for full particulars. Chemical Silvering Co., Ft. Wayne, Ind. P. O. Box 21.

FREE YOURSELF from wage drudgery! 12 ways, 2 cents. "Be. Money Back Store," Baltimore.

BUY YOUR NECKTIES DIRECT from the manufacturers, 50c sample tie for 25c. Agents wanted write for terms. Quality Neckwear Co., 1216 E. Madison st., Baltimore, Md.

SEND US 25 CENTS and we will send you complete instructions for silvering and re-silvering mirrors. Mail Order Bureau, Box 283, Scranton, Pa.

\$100 BRINGS \$1,000 A YEAR. A safe, sound, honest investment with chamber of commerce references. Continuous income without one cent going out. A golden opportunity like this for enormous profits in small investment comes but few times in life. Write quick for convincing proofs—they cost nothing and may mean a fortune to you. Box 203, Mt. Vernon, O.

INCREASE YOUR INCOME. Be independent. Our book contains a valuable collection of formulas, plans, schemes; how to make good money during your spare time. Send 6—2c stamps now and turn your spare time into cash. Albany Supply House, 4322 N. Albany Ave., Chicago.

START METAL ETCHING BUSINESS, make name plates, watch fobs, etc. Small capital required; no experience needed; information and instruction booklet ten cents; or send at once for our Leader Outfit (booklet included). Price \$2.00; shipping prepaid; containing everything necessary, and 8 brass articles with stamped design. The Wakefield Co., 142 Wakefield Ave., Dept. 8, Buffalo, N. Y.

ONE OF YOUR PRACTICAL IDEAS; and our list of Unique Formulas and Recipes will enable you to be independent all your life. Try it; write today. Daniels & Sons, Jersey City, N. J.

I AM IN ACTIVE TOUCH with every well driller, hardware and agricultural implement dealer in the United States. Will advertise and sell article of merit that can be sold to that trade. Fall catalogue goes out middle of August. B. D. Hoeftel, 500 Aldine Square, Chicago, Ill.

SUCCESSFUL MAIL-ORDER PLAN free. Sixty Modern Money Makers 30c. Popular Clubs, 7114 Eggleston, Chicago.

HOME OFFICE BUSINESS. No canvassing required. Good income. Write today for full particulars. Joquel, 1705 Wyoming St., El Paso, Texas.

BE INDEPENDENT. Start Money Making Mail Order Business at Home. New plans. Everything furnished. Only small capital required. Free booklet and particulars tell how. W. P. Miller Co., Box 254, Muskegon, Mich.

WE START YOU in a Permanent Business with us and furnish everything. We have new easy selling plans and seasonable leaders in the mail order line to keep factories busy. No canvassing. Small capital. Large profits. Spare time only required. Personal assistance. Write today for plans, positive proof and sworn statements. J. M. Pease Mfg. Company, 181 Pease Bldg., Michigan St., Buffalo, N. Y.

START A MIRROR FACTORY in your town!! We teach and trust you. \$10 to \$25 daily guaranteed. 10c brings sample lesson! Booklet! Proof! Hullingers (2), Francesville, Ind.

48 BUSINESS SECRETS to become rich. Write for my circular. Geo. S. Ross Co., New Orleans, La.

MAKE MONEY WRITING SHORT STORIES. Big pay. Free booklet. Tells how. United Press Syndicate, San Francisco.

INCORPORATE your patents and business under Arizona Laws. Cost very small. No annual or franchise tax. Members exempt from corporate debts. No public statements required. No restrictions. Hold meetings and do business anywhere. Charters cannot be repealed by subsequent laws. Particulars, laws and forms free. Southwestern Securities & Investment Co., Box 1488, Phoenix, Arizona.

START A MAIL ORDER BUSINESS of your own. Be your own boss. I made \$25,000 in two years with small capital to start. My booklet "Money Making Opportunities in the Mail Order Business," sent free. Address, McKean, Dept. 375, No. 2232 Eighth Ave., New York.

PATENTS SECURED—C. L. Parker, ex-examiner Patent Office, 910 G St., Washington, D. C.

BUILD A BUSINESS of your own and escape salaried drudgery for life. Learn the Collection Business. Limitless field; little competition. Few opportunities so profitable. Send for "Pointers" today. American Collection Service, 101 State St., Detroit, Mich.

I WILL START YOU earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operation. G. F. Redmond, Dept. 306, Boston, Mass.

FORM A CORPORATION—Congress Law for D. C. and all States; cheap. Raise money easily; advice free. U. S. Legal Corporation, Washington, D. C. Representing \$1,225,000,000.

POSITIVELY BEST RIBBONS, three, \$1.10. See what I say under "Typewriters." Atchison.

AGENTS WANTED

EARN A SUIT IN ONE HOUR! Your profit for an hour or two as the representative of our great tailoring house pays for a special made-to-measure suit for you—the handsomest, the most stylish and the most durable ever made. Just show two or three of your friends the samples of our fine wool suitings, take two or three orders and you have earned the suit. You can't fail to get orders. Our 60 beautiful samples create a sensation wherever shown. No one ever saw such materials at the price before. You take no risk. Everything is shipped on approval, subject to 24 hours' examination. Customers try goods on and must be satisfied with style, fit and quality before paying. We pay express on everything. You can undersell everybody. Get clothes for your friends at less cost than they pay anywhere else and make wholesaler's, jobber's and retail dealer's profits. That means the swiftest, cleanest and nicest business in America! A big Business that more than doubles your earnings. We want you to represent us now. Don't wait until somebody else takes this great business. No experience necessary. We furnish you our portfolio with 60 samples of the latest weaves, fabrics and colors, absolutely free. Do you want this swell made-to-order suit and this remarkably easy money-making business that will make you rich? A postal or letter mailed to us at once gives you swell clothes and a big business. Write us now. A postal card will do. Or tell your friends about it. Paragon Tailoring Company, Dept. 11, Chicago, Ill.

GOOD LIVE AGENTS wanted everywhere to sell our new combination pencil holders for telephones. The most novel and useful article ever placed on the market. Remarkable seller. Large profits. Write at once for free particulars. Sample 25 cents. The Wm. W. Bythiner Mfg. Co., 308 Race St., Philadelphia Pa.

AMAZING INVENTION—Entirely new lamp burner. Changes ordinary kerosene illumination into beautiful large white gas light. Guaranteed Smokeless. Odorless. Not a mantle. Can't break. Unlike others. Brings you quick sales, large profits. Show ten, sell nine. Only 35c retail. This territory just opened. Act now. "Radiolite," 364 Colonnade, Toledo, O.

SALESMEN WANTED FOR MEN'S tailored clothes. A high-class line, guaranteeing your trade satisfaction in every respect, at moderate prices. Good service, prompt shipments and good profits assured—a connection you can be proud of. M. D. Good Co., 141 S. Fifth Ave., Chicago.

MAKE FROM \$30 to \$50 a week by showing our line of samples of men's suits and overcoats. Orders come quick and easy. No money or experience necessary. We back you up. Our \$25 sample suit offer to agents a winner! Write today for entire outfit, free! Great Central Tailoring Co., 771 Jackson Blvd., Chicago.

AGENTS—Biggest money-maker known. The new Canchester Incandescent Kerosene Lamp revolutionizes old lighting methods. Burns air, not money. Six times brighter than electricity, gas or acetylene at 1-10th cost. Burns with or without mantle. Burner fits any lamp. Saves 75% oil. No trimming wicks. Showing means selling. Territory going fast. Write today. Handsome outfit furnished. Canchester Light Co., Dept. P. M. 8, 204 No. State St., Chicago.

WE WANT ACTIVE AGENTS to sell our wonderful guaranteed "Modern" Self-heating Gasoline Irons, Safety Iron Stands and Modern Make-Milwaukee Specialties, 100% profit, 10c brings burglar lock. Outfits furnished. We advertise, you sell. Be independent. Own your business. Be the first to secure this big money making agency. Postal brings summer catalogue (P) and exclusive proposition. Our agents are protected as we are the patentees. Modern Specialties Mfg. Co., Milwaukee, Wis.

EVERYBODY CAN SHINE THEIR SHOES with ease, convenience and economy by using the Kroll Patent Shoe Polisher. In tremendous demand. Agents making piles of money. Write today for exclusive territory. Adam J. Kroll, 600 Blue Island Ave., Chicago.

MY! HOW THEY FALL for our "Lucky Leven" toilet combination (\$3.20 value). You sell for \$1.00. Other fellows making \$6, \$12, \$15, \$20 and \$25 daily. Will put you on Easy Street. Great crew Managers' proposition—good for \$100 profit weekly. This is only one pippin in our "27 varieties." We manufacture—you save middleman's profit. Our new colored circular is like seeing the real goods. Free to workers. Get aboard. Act today. Davis Soap Works, 264 Davis Bldg., 1429 Carroll Ave., Chicago, Ill.

WANTED—GENERAL DISTRIBUTING AGENT in each district, for brand new specialty for men, just being placed on the market. Permanent line, exclusive control. Particulars free. Sample 10c. The Kelsh-Bennage Co., Denckla Building, Philadelphia, Pa.

WEAR A STYLISH SUIT! Clothes make the man. The man who is admired is the well-dressed man whose clothes are fashionable, and are 1911 styles. You will be that man in your neighborhood! 1911 styles are just in. Get this suit—the swellest, classiest, snappiest style we ever created, and better your appearance! This is our idea: We want one man as our representative in your neighborhood. You've got a lot of friends. They wear clothes. It is the easiest thing in the world to get them to order their clothes from you. Prices, \$7.50 and up. These orders mean a big business that more than doubles your salary, and the work is the easiest, cleanest, nicest occupation in the world. New representatives make \$5 to \$10 a day. You simply take the order and measurements and mail them to us. We make the clothes, ship them in approval to your friend and hand you the profit money. A Regular Cinch! That's the beauty of being in business for yourself. Sit right down now; write us a postal or a letter for the free outfit to representatives. And you get the swellest suit of fashionable tailor-made, all-wool, 1911 clothes ever worn in your neighborhood. If your personal appearance and a big business is worth a postal or a 2-cent stamp to you, then act now—write us today. Address, American Woolen Mills Co., Dept. 468, Chicago.

AGENTS, TEACHERS, STUDENTS, here's your opportunity. Sanitary dustless rugs. Gem ironing shoes. Many new household specialties that sell in every house. \$5.00 daily easily made. Now is the time to start and get in on the ground floor. For samples and particulars address Dexter Supply Co., 508 S. Dearborn, Chicago.

"AGENTS, 100% PROFIT." New Patented Automatic Razor Strop, automatically puts a perfect edge on any razor, old style or safety. Retail at \$2. Big seller. Every man wants one. Write quickly for terms, prices and territory. P. Brandt Cutlery Co., 84 W. Broadway, N. Y. City.

THE IDEAL combination steamer, cooker, roaster, baker, for home, tourists or camping. Telescopes. Carry in grip. Real value \$2. Price only \$1 postpaid. Agents wanted. Ohio Cooker Co., Ottawa, Ohio.

ANY LIVE AGENT CAN make 100% profit working for us. New article, sells for 25c, universal demand, exclusive territory, quick sales. Send now for free sample and terms. The G. V. Sales Co., 150 Nassau St., New York, Room 1325.

PERFUME GLOSS IN STARCH makes clothes white as snow, and leaves lasting perfume of Fresh Azure Violets. Send 4 cents. Agents wanted. Shipman Agency, Dept. D, Buffalo, N. Y.

AGENTS AND SALESMEN WANTED to sell our high grade Imported Chewing Gum De Luxe. Made in Germany. Send 5c for full size package and Agents proposition. Large profits and continuous sales. Danier Chewing Gum, 216 West 28th St., New York.

AGENTS TO SELL new Automatic device. Big profits. Unworked field. Write today for our profitable offer. Superior Wrench Co., Box 906, Marshalltown, Iowa.

A BUSINESS FOR YOU, spare time or all the time. Will pay from \$10 to \$200 per month on very small investment, operated anywhere. Particulars free. Thos. A. Hill, Dept. 20, 3300 Quivas, Denver, Colo.

\$10 DAILY SELLING GEM CAMERA outfit complete—takes, develops and prints pictures in two minutes. Guaranteed. Retail \$2. Sample prepaid \$1.00. Gem Supply Co., Dept. M, 200 Fifth Ave., N. Y.

AGENTS MAKE \$6.00 to \$24.00 per day easy, selling our automobile specialty; particulars free. Write today. Philleo Supply Co., Grand Rapids, Wisconsin.

AGENTS—Latest craze is mystic polishing cloth; our trial before selling plan sells the goods; it's free. Write today. Western Mfg. Co., A., Sterling, Ill.

\$25 WEEKLY and expenses to men and women to collect names, distribute samples and advertise. Steady work. C. H. Emery, M. N., Chicago, Ill.

AGENTS WANTED in every county in the Union to sell Magic Spray. Profits enormous. Get testimonials. Southern Spray Co., 5 North 7th St., Richmond, Va.

WANTED, LIVE AGENTS to sell the Celebrated Peerless Electric Flat Irons. Big money. Sells on sight in hot weather, weighs 5 lb., full nickel-plated; get busy. Sample \$2.50. Write at once. Machinery Sales Co., 17 East Woodbridge St., Detroit, Mich.

SIGN PAINTING AGENTS. 1000% profit. Best and cheapest window letter made. Samples free. Success positively guaranteed. Experience unnecessary. Embossed Letter Co., 2563 Milwaukee Ave., Chicago.

AGENTS—We manufacture specialty never placed on market before. Not for sale in stores. Household necessity. Sample and particulars 10c. LeRoy Specialty Co., 76 Park Place, Room 52, New York.

LIVE WIRE SALESMEN, sell our own make brushes for every household use. Write for particulars, territory and the eight advantages of our propositions. 125% profit. Capitol Brush Co., Hartford, Conn.

AGENTS WANTED EVERYWHERE to sell our New Automatic Strop. Puts a perfect edge on any razor, safety or old style. Quick sales; large profits. See our display ad on page 125 this issue. S. C. Kanner, 556 Broadway, New York.

AGENTS—You can make \$250 monthly acting as local representative of the land department of the Kansas City, Mexico & Orient Railway—the largest railway under construction in the United States. This new transcontinental railway is building daily and will soon reach the famous Lower Pecos Valley in Southwestern Texas. This rich, fertile valley is being developed rapidly and millions of dollars are being invested in this new country. Irrigated land, town lots and agricultural lands for sale; \$300,000 irrigated project just completed. The land department of the Orient Railway leads in this development and settlement work and needs able, reliable and energetic representatives in every locality. The people are interested—they are headed toward this new undeveloped empire. It is the last and best southwest—a land of expanding irrigation projects, alfalfa ranches and fruit farms. Fortunes are being made from the soil by settlers already there. A dignified and responsible position for those who will cooperate with me. No investment required; evidence of character necessary. Positions of trust and importance created for good men. No salaried jobs to beginners. Good commissions. Write quick for free literature and full details. F. A. Hornbeck, Land Commissioner, Kansas City, Mexico & Orient Railway, 112 Orient Bldg., Kansas City, Mo.

AGENTS, operators, salesmen; big money operating and selling fifty six box match machines, stores, restaurants, merchants. Territory given; liberal inducements. Write. Lion Machine Co., Detroit.

WANTED, AGENTS TO SELL the best and cheapest Hand Vacuum Cleaner on the market; 100% profits. West Penn. Plating & Mfg. Co., Pittsburg, Pa.

AGENTS make \$25 to \$100 weekly selling most useful article on the market. Florence Novelty Co., Dept. I, Box 4505, Philadelphia.

AGENTS—500% profit in 'Sign Letter Business for you. Particulars, Sample free. Burkhard Co., Butler, Pennsylvania.

IF YOU WEAR GLASSES use "See Clear," cleans, polishes, prevents dimming; pocket size 10c (special this month 5c). Agents coin money everywhere. Evans Co., 2340 7th Ave., New York.

COLLECT NAMES, information, for business concerns. Steady, profitable home business. Instructive booklet for stamp. Information System, 253 Marietta, Ohio.

AGENTS—College students earn big vacation money selling our instantaneous automobile tire repairs; one agt. sold 160 one week. Free booklet. Chas. Kinsey Co., Willow Grove, Pa.

WE ARE MANUFACTURERS of New Highgrade Original Air Brush Design Show Cards. Every storekeeper buys. 400% profit. Catalog containing 350 varieties free. Samples 10c. Peoples Show Card Concern, 750 W. Madison St., Chicago, Ill.

AGENTS—Both sexes; we manufacture and control the fastest selling household specialty ever invented. Connolly Co., 123 Liberty, New York.

WAY TO SUCCESS in the mail order business, tells how I made \$18,000.00 in three years. Worth dollars to you. Free on request. H. System, 107, Marion, Kentucky.

GOLD NUGGETS COMPOSITION PINS, chains, charms, cuff buttons; sure money getter. "Smiley & Co.," Red Bluff, Cal.

PORTRAIT AGENTS—Get your work done direct from the artist, lowest prices. Write for particulars. J. Hausknecht, 1730 W. 18th St., Chicago, Ill.

BIG PROFITS. Manufacture Barley Crisp. New confection. Costs 1/2c to make, sells like hot cakes for 5c. Machine and instructions \$7.50. Send 10c for samples and literature. Shafer & Co., 529 Natoma St., San Francisco.

VICTOR CHECK PERFORATOR now selling 50c to business men. Half to you. See page 81, July Popular Mechanics. Sample 25c. Reynaud, 115 Broadway, New York.

NO EXPERIENCE NECESSARY to make \$10 a day with the most useful automobile specialty on the market. Write today. Home Supply Co., Dept. B, Saltsburg, Pa.

AGENTS—OUR HOUSEHOLD NECESSITY appeals to everyone. Quick sales, big profits. Investigate. Jersey Supply House, Washington, N. J.

AGENTS—PORTRAITS 35c, FRAMES 17c. Sheet pictures 1c, stereoscopes 25c, views 1c. 30 days' credit. Samples and catalog free. Consolidated Portrait, Dept. 119 Z, 1027 W. Adams St., Chicago.

AGENTS make \$10 to \$25 daily. Motorboat, aeroplane, automobile necessity. Strictly new. Guaranteed. Rapid seller. Write today. Economy Supply Co., 4934 Harrison, Chicago.

SMALLEST ALARM CLOCK, bible and telescope, 10c each prepaid. W. H. Garner, A-119 South Lafayette St., Evansville, Indiana.

AGENTS! ANYBODY! EITHER SEX; it's easy. Manufacture most wholesome, fastest selling food specialty at home. Start with \$5. Wholesale to stores, 84c profit every \$1 sale. Materials obtainable anywhere. Only kitchen utensils necessary. Complete process, directions, samples, etc., tells how. Postpaid 25c. Worth dollars. Brown's Delicacy Supply, 316 So. Figueroa St., Los Angeles, Cal.

THE COMBINATION KEY RING, seven articles in one, lightning seller. Sample 10c. Beers, 68 Bradley Beach, New Jersey.

\$100 MONTHLY and expenses to trustworthy men and women to travel and distribute samples; big manufacturer. Steady work. S. Scheffer, Treas., M. S., Chicago.

AGENTS WANTED—SELL RICH LOOKING IMPORTED 36x68 tugs. \$1 each. R. H. Carter, Milan, Tenn., sold 115 in four days; his profits \$51. You can do as well. Write for sample offer and unique selling plan; exclusive territory. A. Condor, Rug Importer, Stonington, Maine.

THE FUNNIEST ILLUSTRATED PAPER on earth. The Mars Planet tells about unexplored lands on the planet of Mars and what this world will be two hundred years from now. Side-splitting throughout. Agents Wanted. Sample copy, 10 cents. Joseph Mathieu, 203 Court St., Brockton, Mass.

SELL CHAUFFER'S BLUE BOOK. How to drive, adjust, maintain automobiles and pass examinations. Quick seller; sample copies, 20c. Charles Milward, 1546 N. 60th St., Philadelphia, Pa.

MEN OF IDEAS or inventive ability. Address Greeley & McIntire, Patent Attorneys, Washington, D. C.

AGENTS MAKE MONEY selling the Dollar Adding and Subtracting Machine. Particulars free. D. Bassett, 5921 Indiana Ave., Chicago.

AGENTS. DON'T BOTHER with cheap trashy jewelry and tableware—it injures your reputation. Sell at low prices dependable sterling and plated silverware, jewelry, leather goods, razors, toiletware, fountain pens and novelties. Watches and diamonds at cut prices. We prepay all express and mail charges—our line of 3,000 absolutely reliable and fully guaranteed quick-selling articles is the largest and best offered by any agency company in the world. Write today for free catalog of 750 pictures and particulars about agents' free sample outfit. A. W. Holmes & Co., Dept. B-10, Providence, R. I.

BUILD UP A PERMANENT BUSINESS of your own. Represent us exclusively in your territory. No canvassing. Repeat orders. We, as manufacturers of patented specialties, want "live" men on our original selling system. Everything complete for you to start at once. Field unlimited. If you mean business write today. J. M. Pease Mfg. Co., 182 Pease Bldg., Michigan St., Buffalo, N. Y.

MAKE PHOTO PILLOW TOPS and Post Cards yourself by easy secret process; no darkroom, no toning; big profits; learned by anyone at once; send today for free particulars. G. S. Vallance Co., Elkhart, Ind.

WONDER OIL LAMP—Revolutionizes lighting—needed everywhere—60,000 already sold; agents enthusiastic; big profits; exclusive territory. Write quick. Free sample to active agents. United Factories, Dept. 6, Kansas City, Mo.

AGENTS WANTED to sell our beautiful scripture wall mottoes. Frank Shilling Co., Navarre, Ohio.

AGENTS—Over 500% profit. Gold sign letters; sell everywhere; sample free. Johnston Co., Quincy, Ill.

AGENTS WANTED—Rubber stamps and novelties. Send 4c for full particulars. A. S. Mankin & Co., Alexandria, Va.

AGENTS—WE MANUFACTURE GLASS PAPER. Plain glass windows made to look like real stain glass; something new; easily applied; big money maker; two sample sheets of paper, with catalogue in colors and discount sheet, for 10c. S. H. Parrish & Co., 202 S. Clark St., Chicago.

PERFECTION POCKET ADDING MACHINE. Lightning seller. Agents wanted. Cincinnati Specialty Mfg. Co., Dept. R., Cincinnati, Ohio.

AGENTS EARN BIG MONEY selling latest styles beautiful braided and embroidered waist patterns, dresses, Mexican drawn work linens, renaissance, petticoats, etc. Catalogue free. National Importing Co., Desk 27, 699 Broadway, New York.

GERMAN SILVER KEY CHECKS—Steel letters for marking same, key rings, etc.; over 30 styles. Agents wanted. Sample marked with your name and address, and key ring, 15c. Pease, Die Maker, Winchester, N. H.

AGENTS WANTED—\$25 to \$100 per week easily made selling high-grade Automobile Specialty. Agents Supply Co., Box 98, Muscatine, Iowa.

AGENTS—\$50 weekly: we manufacture the best needle case made; a wonderful seller; 200 to 500 per cent profit; talking unnecessary; our copyrighted "Trust Scheme" Envelopes do the work; general agents can make over \$100 weekly; send 10c for a 25c sample containing 115 needles; particulars free; buy direct from the factory at wholesale. Paty Needle Co., 102 Union Sq., Somerville, Mass.

BECOME A MANUFACTURER'S AGENT. We manufacture hosiery which outwears 3 of the ordinary kind, replaced free when hole appears. Easy sales; large profits. First reply obtains agency your city. Triplewear Mills, Dept. D, 724 Girard Ave., Philadelphia, Pa.

MEDALLIONS SELL AT SIGHT. 300 per cent to 500 per cent profit. Make up your own goods and be independent. "It's easy." Catalog free. Fred Resag Co., 1205 W. Randolph St., Chicago.

AGENTS—\$5 daily selling our Handy Tool, 12 articles in one. Lightning seller. Sample free. Thomas Mfg. Company, 462 Third St., Dayton, Ohio.

THE NOEL KEROSENE MANTLE LAMP beats electricity, gas or gasoline. The most economical light to burn. A whirlwind seller. Customers delighted. Agents write for territory. John S. Noel Co., 10th St., Grand Rapids, Mich.

AGENTS—\$30.00 WEEKLY easily made selling our Yankee Self-Wringing Mop and Duster; 500 other fast sellers; samples free. Scheff Co., 1637 Wells Street, Chicago.

WIDOWS, Ladies, Men, New, Interesting. Profitable, easy work. Spare time or permanent. Sell our useful specialties. Our original selling plan will double your sales. Particulars and \$2.00 premium offer free. Fair Mfg. Co., HF51, Racine, Wis.

YOU CAN MAKE \$\$\$\$ as our general or local agent. Household necessity; saves 80 per cent; permanent business; exclusive territory; salary or commission; free sample; credit. J. Pitkin, Newark, N. Y.

I WILL START YOU earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operation. G. F. Redmond, Dept. 306, Boston, Mass.

AGENTS make big money selling our new gold letters for office windows, store fronts and glass signs. Any one can put them on. Write today for free sample and full particulars. Metallic Sign Letter Co., 406 N. Clark St., Chicago.

ONE MILLION AGENTS WANTED; fast seller costing 5c, selling 50c. Every firm needs. Orders to \$50. Postal brings samples. Embossed Co., 2497 Milwaukee Ave., Chicago.

FREE GOLD SAMPLE goes with first letter. Something entirely new. Every firm wants it. Orders \$1.00 to \$100.00. Nice pleasant business. Write today. Metallic Mfg. Co., 406 N. Clark, Chicago.

HELP WANTED

WANTED—ASST. FOREMAN—A practical tool and die maker. We want an intelligent man possessing executive ability and able to lay out tools for cutting and drawing light sheet metals. A man with experience at making cocking utensil tools preferred. State age and salary wanted and where you have been employed. Address Supt, 880 Downer Ave., Milwaukee, Wis.

RAILWAY MAIL CLERK, Post Office Clerk, and Carrier Civil Service Examinations are held in the Fall. Commence preparation now under the personal supervision of a former Member and Secretary of the Board of U. S. Civil Service Examiners, 7 years' experience in conducting Civil Service Examinations has shown us exactly the kind of preparation that an applicant requires. We can prepare you right. Write today for our big free descriptive booklet. Patterson Civil Service School, Box 826, Rochester, N. Y.

MEN WANTED for government positions. Influence unnecessary. Average salary \$1100. Annual vacations, short hours. Send postal immediately for list of positions open. Common education sufficient. Franklin Institute, Dept. L-21, Rochester, N. Y.

\$50 TO \$85 WEEK to honest, earnest, energetic man to handle district sales for U. S. Fire Extinguisher. No experience required but must be hustler. Can make you district manager if you apply now. United Mfg. Co., 1589 Mill St., Lepsie, O.

GOVERNMENT EMPLOYEES WANTED—Send postal for list of positions open. Franklin Institute, Dept. L-21, Rochester, N. Y.

A BUSINESS FOR YOU, spare time or all the time. Will pay from \$10 to \$200 per month on very small investment. Operated anywhere. Particulars free. Thos. A. Hill, Dept. 19, 3309 Quivas, Denver, Colo.

MEN WANTED for government positions. Average salary \$1100. Annual vacations. Short hours. Send postal immediately for list of positions open. Franklin Institute, Dept. L-21, Rochester, N. Y.

BIG MONEY WRITING SONGS, thousands of dollars for anyone who can write successful words or music. Past experience unnecessary. Send us your song poems, with or without music, or write for free particulars. Acceptance guaranteed if available. Washington only place to secure copyright. H. Kirkus Dugdale Co., Dept. 265, Washington, D. C.

5000 GOVERNMENT POSITIONS OPEN. Write for list. Franklin Institute, Dept. L-21, Rochester, N. Y.

THAT TIRED FEELING naturally flies when your automatic "Reliable" Alarm announces its presence to you, 50c postpaid. Reliable Alarm Co., 672 26th St., Milwaukee, Wis.

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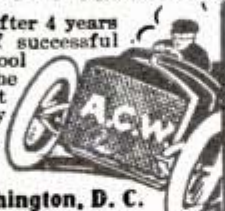
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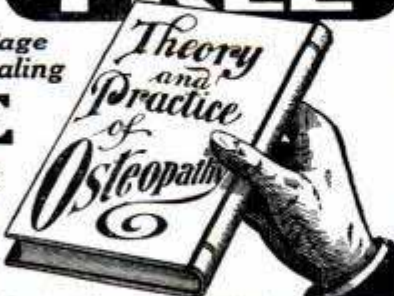
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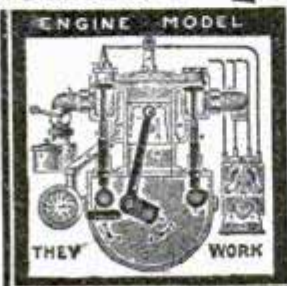
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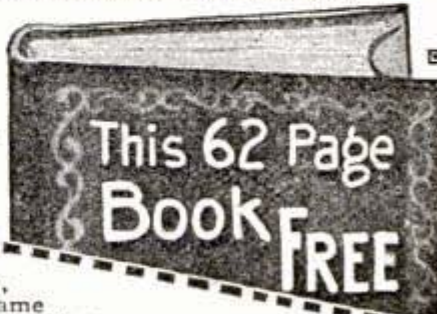


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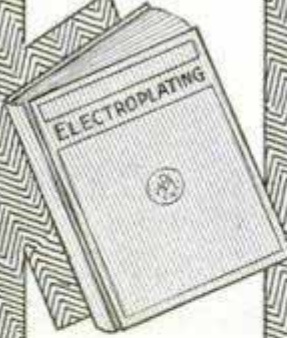
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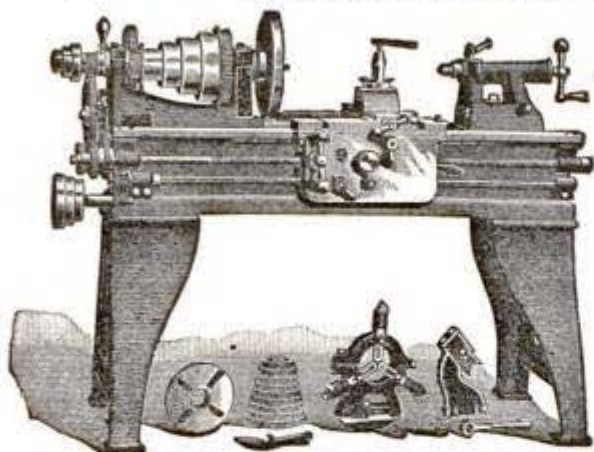
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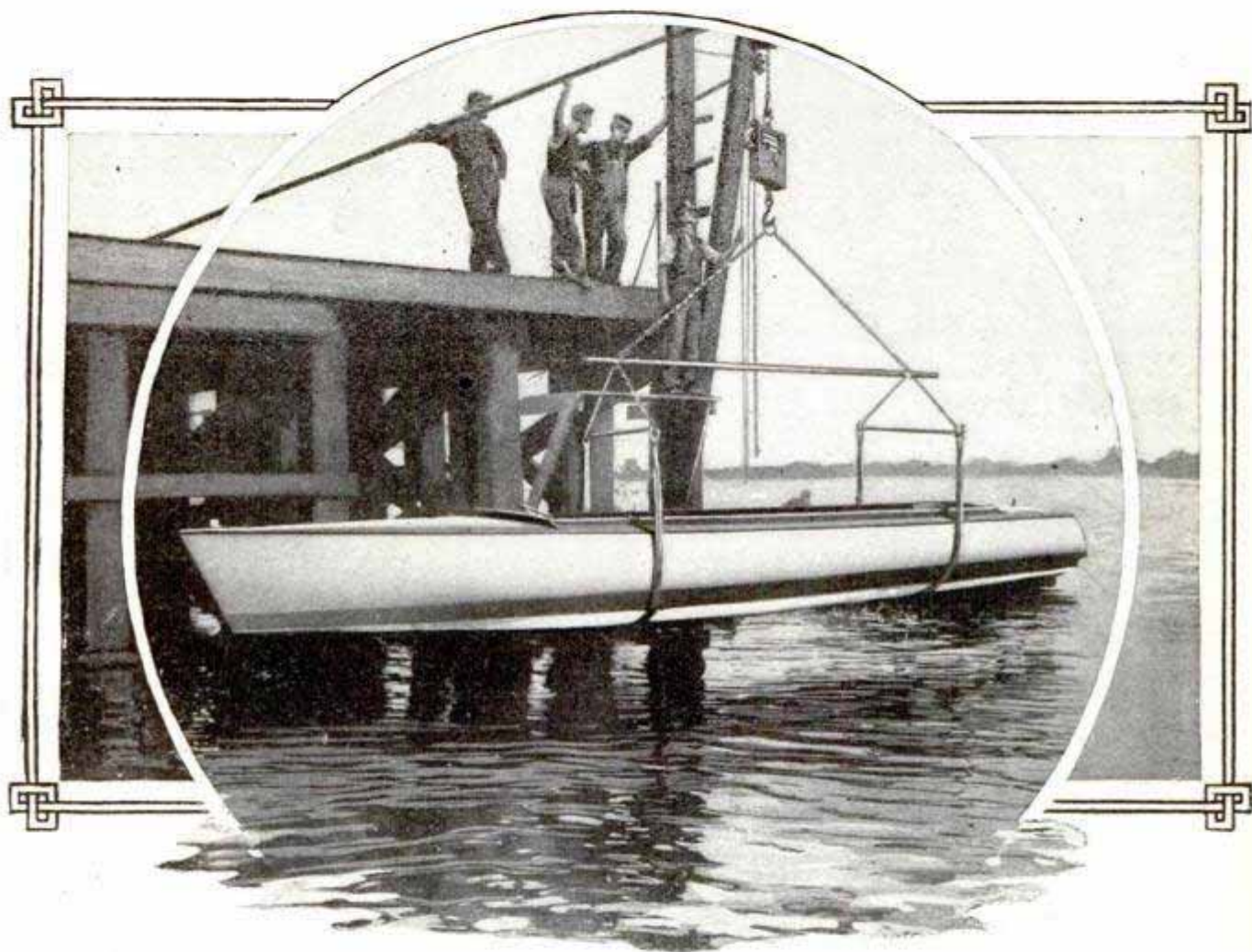
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No. 2

Weighing Crane for Motorboats

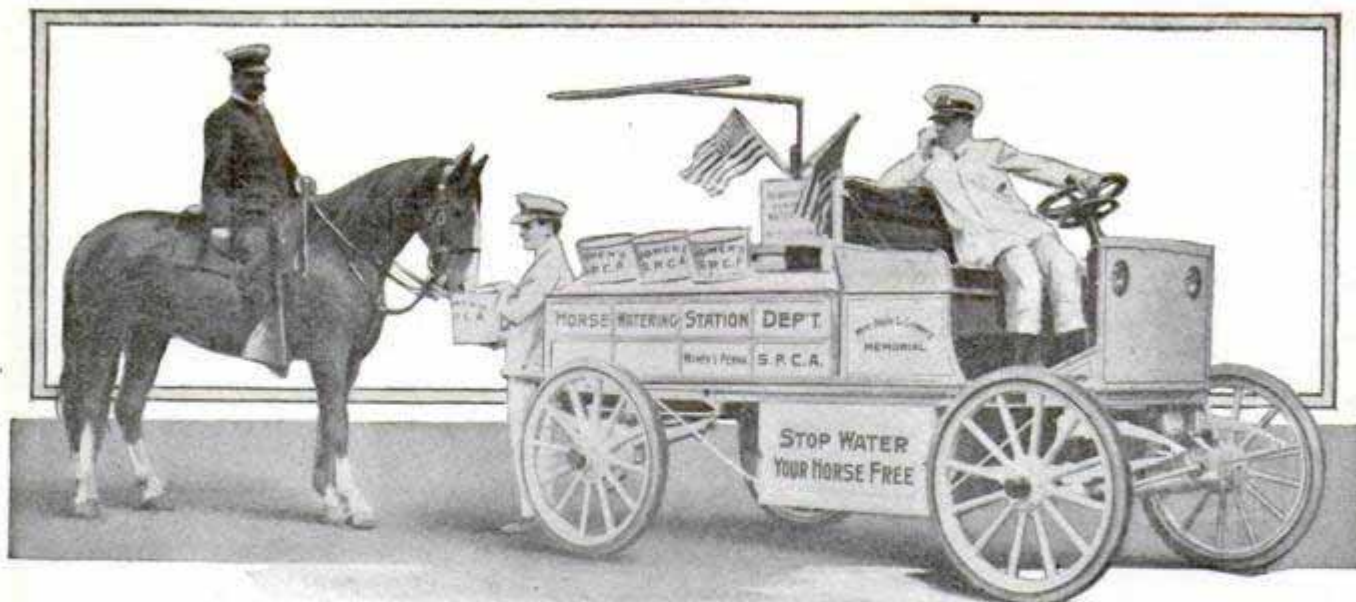


An Ingenious Outfit for Weighing Racing Motorboats

ONE of the difficulties encountered by the promoters of motorboat racing is the necessity for handicapping boats entered in certain classes to make them come within the requirements of the rules governing the contests.

The Delaware River Club has adopted a method of determining the exact weight of a boat, and has established a precedent in this regard for other organizations throughout the country. The device consists of nothing less than a set of scales for boats, and the club's system of handicapping in races is based on the weight of the

boat as shown on this scale. The scales are suspended from a heavy boom attached to an upright on the end of the club dock. From a heavy hook swung under the scales there hangs a pair of slings. The slings are passed under the boat, one at a point midway between the midships section and the bow, and the other midway between midships and the stern. When everything is in readiness to weigh the boat, the boom is raised, hoisting the boat from the water, and bringing the scales to the level of the eye of the official in charge of the weighing.



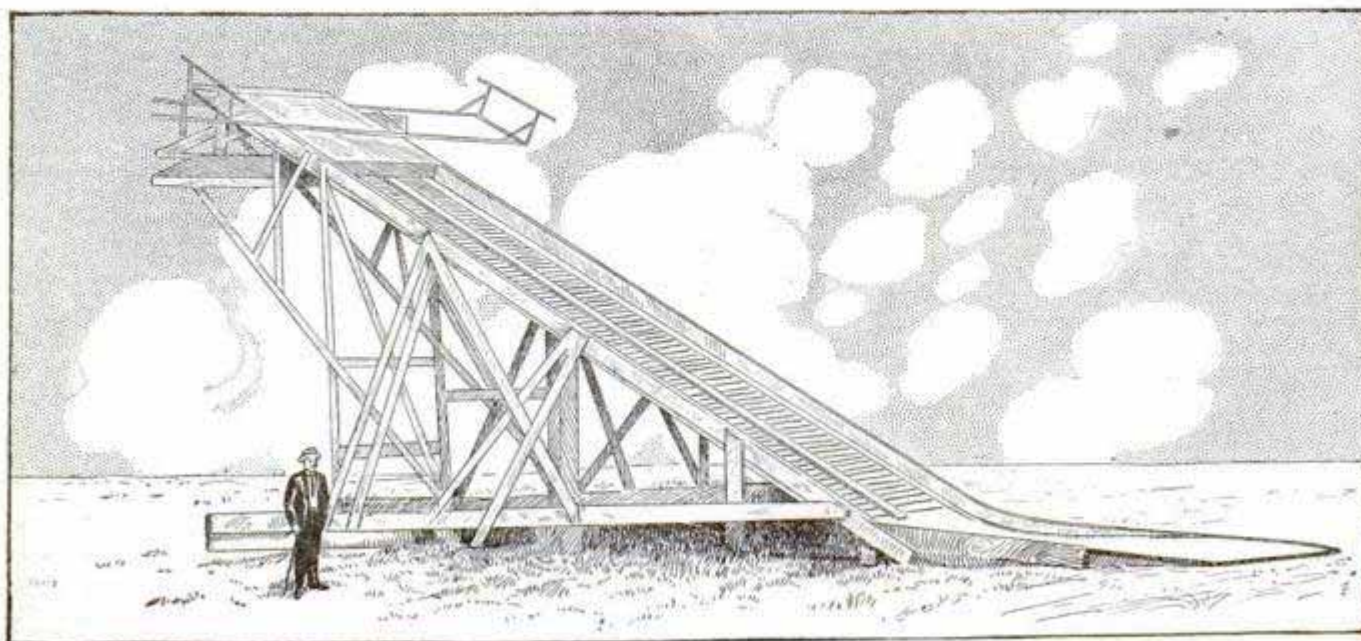
Special Automobile Moves Slowly along Philadelphia Streets with Water for Thirsty Horses

AUTO WATER FONT FOR THIRSTY HORSES

A water-carrying motor car, probably the first of its kind in the world, has been placed in commission in Philadelphia by the Women's Society for the Prevention of Cruelty to Animals, as a dispenser of water to thirsty horses. The car, its mission clearly placarded on its body, will move slowly through busy streets in the parts of Philadelphia where troughs are not available, and any driver can stop it and get a bucket of water free of charge.

HARVARD UNIVERSITY HAS GLIDING SLOPE

The first intercollegiate glider meet, a new branch in college sports, was held recently at Harvard University under the management of the Harvard Aeronautical Society. The gliding slope, from which the small rudderless and engineless aeroplanes were launched in the contests, is shown in the accompanying illustration. This gliding slope is 25 ft. high, with a slope of 52 ft., and is equipped with a light truck and carrier which run on a track.



Harvard University Glider Slope—Revolves to Take Advantage of Prevailing Wind

TERRA COTTA CAUSES BIG ECONOMY IN BUILDING

A saving of over \$500,000 was effected in the cost of building the State Educational Building, at Albany, N. Y., by making the decorative parts of the structure in terra cotta instead of chiseled marble. The columns and other plain parts were made of marble, and the capitals and other ornamental features were made in terra cotta finished in glaze to match the natural stone.

There are 28 columns used in the building, and the capitals for them are the largest ever made of terra cotta. These capitals are said to have cost \$400 each, as against an estimated cost of \$2,400 each for the same work in carved marble, thus showing a total saving of \$56,000 on the capitals alone.

The original design for the capitals was first modeled in clay under the supervision of a well known architect. This master

model was then cut into 50 pieces from which the plaster molds were made. From these molds the 28 capitals were produced, and the molded parts were

then sprayed with a white glaze and burnt in a muffled kiln at a temperature of 2,300 deg. Fahr. The beauty and massiveness of the terra-cotta capital are apparent from the photograph reproduced herewith.

A somewhat different method was employed in making a panel representing Esculapius, the mythological god

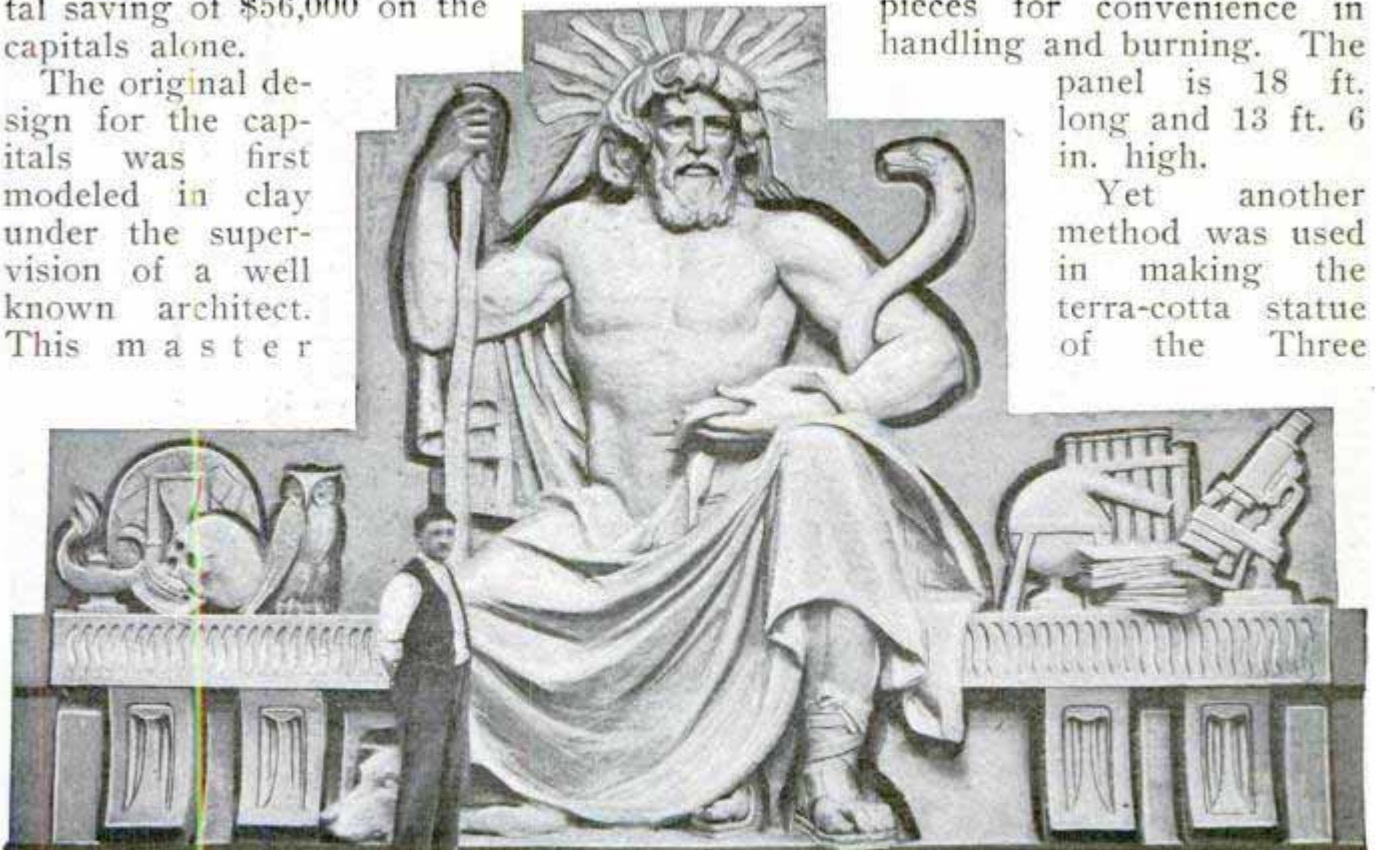
of medicine, for the Pittsburg School of Medicine. As only one panel was required, it was modeled directly in terra cotta without using molds, and

was cut into a number of pieces for convenience in handling and burning. The panel is 18 ft. long and 13 ft. 6 in. high.

Yet another method was used in making the terra-cotta statue of the Three



One of the Terra-Cotta Capitals for the State Educational Building, Albany, N. Y.



Terra-Cotta Panel of Esculapius, Mythological God of Medicine, for the Pittsburg School of Medicine

Graces for an estate on Long Island. It was not desired to cut this piece into sections, and owing to the difficulty of handling unburnt pieces of this size

(the statue is 10 ft. high) it was modeled in the kiln which had to be partly demolished to get the statue out after firing.

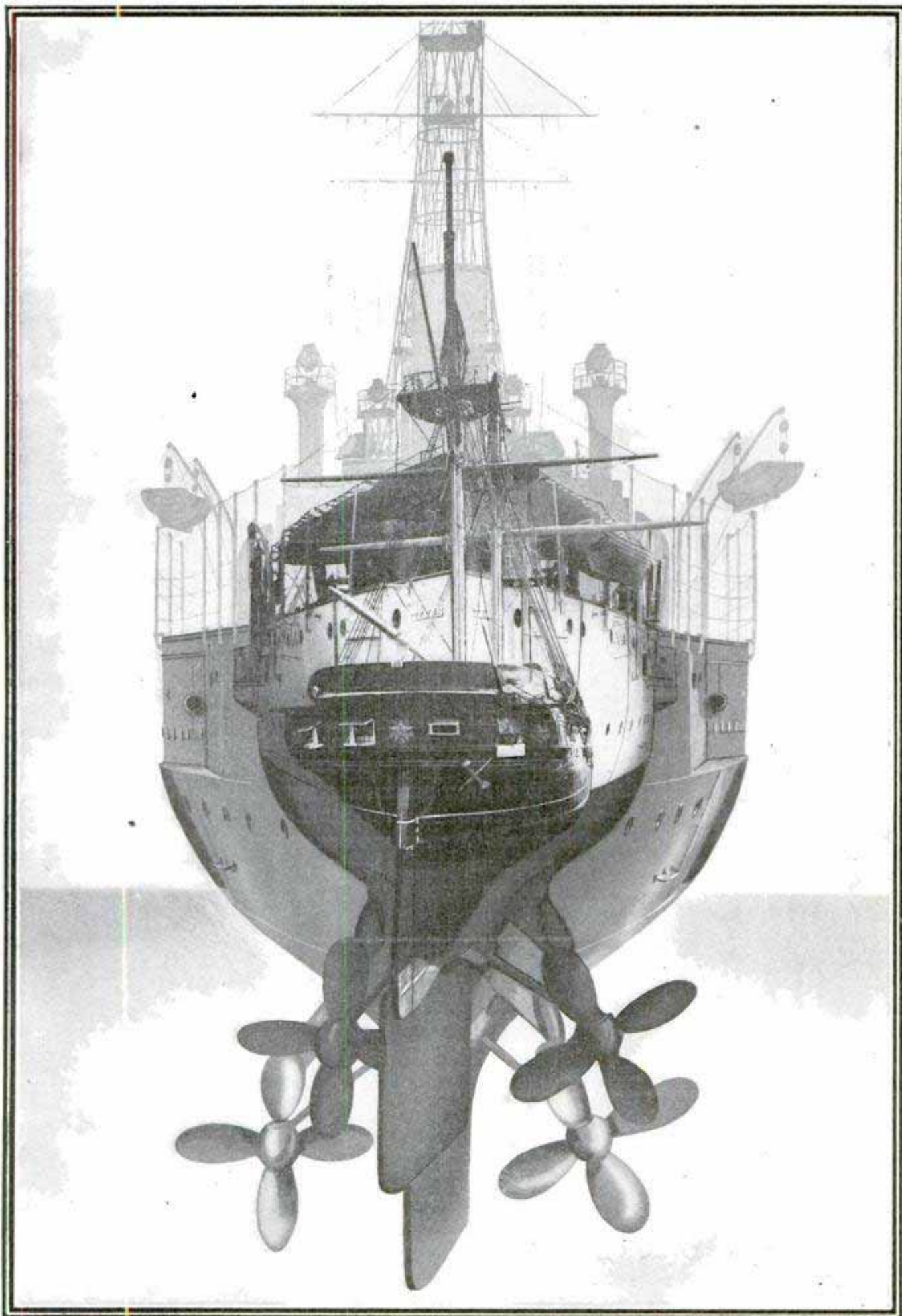
THE ALPHA AND OMEGA OF NAVAL PROGRESS

IN the official list of vessels of the United States navy, only a few lines of small type separate the word "Arkansas" from the word "Constellation," but these two names mark the Alpha and Omega of naval prowess as well as the Genesis and Revelation of the sea power of the United States. Up to the time of the Civil War, wood and the old lines of the sailing ships were still used in the building of war vessels, as they had been for centuries. The "Monitor" was really the progenitor of the dreadnaught of the present day. But naval architects improved on the model. Some 25 years after the close of the Civil War, the cruiser and monitor types were combined to form the first of the type now known as a battleship. The "Texas"—lately rechristened the "San Marcos"—is generally given the credit of being the first battleship in the United States navy. And from her model grew the mighty structures of today. These three ships, the "Constellation," the "Texas" and the "Arkansas" represent three important steps in the development of the American naval power so far as construction is concerned.

The "Constellation" was launched at Baltimore in 1797. She is a full-rigged ship of 36 guns, 1,970 tons' displacement, 176 ft. long, 42 ft. beam, 20 ft. draft. The "Texas" was launched at Norfolk in 1889, and is a steel battleship, 6,315 tons' displacement, 301.4 ft. long, 64.1 ft. beam, 22.6 ft. draft, and carries two 12-in. and six 6-in. guns in her main battery. The "Arkansas," which was launched at Philadelphia this year, is a steel battleship, 26,000 tons' displacement, 554 ft. long, 93.3 ft. beam, 28.6 ft. draft, and her main battery consists of twelve 12-in. and twenty-one 5-in. guns.

There is no way of comparing the early and the newest types of battleship in actual war, as there has been no war since the dreadnaught type was invented; but the recent performance of the "Delaware" of the modern monster type, on her 26,000-mile voyage, contrasted with the famous 14,000-mile trip of the "Oregon," furnishes interesting data. The displacements of these ships are 20,000 tons and 10,286 tons, respectively. The "Delaware" voyage was from Hampton Roads to Valparaiso (Chile) and return, and then to Europe and return by way of the West Indies. The cruise of the "Oregon" was from San Francisco to join the fleet under Admiral Sampson in Cuban waters during the Spanish War. The "Delaware" made the journey at an average speed of 13 knots (14.97 miles per hour), and the "Oregon" averaged 11 knots (12.67 miles per hour). The coal cost for the bigger and newer ship was 70 per cent less per knot than it cost to drive the "Oregon" on her famous voyage. The two cruises were made under entirely different conditions, but these figures make interesting comparison when considered with the fact that the "Delaware" is twice the size of the "Oregon" and yet she cost to build and equip \$388.22 per ton while the "Oregon" cost \$639.10 per ton.

Out of 14,000 houses in Duluth, Minn., no less than 12,000, or about 86 per cent of the total, are wired for electricity, a still more remarkable fact being that the number of houses using electricity exceeds by 2,000 the houses connected to the water supply, and by 5,000 those using gas.



DEVELOPMENT OF THE AMERICAN FIGHTING SHIPS FROM WOOD, SAILS AND SMOOTHBORES
TO STEEL, STEAM AND 12-IN. RIFLES

Stern view; show progressively, the "Constellation," 1797; the "Texas," 1889; the "Arkansas," 1911

HOME-MADE SOLAR HEATER

Sunshine is the cheapest heating power to be found in the Southwest, and this illustration gives a fair idea



Utilizing the Sun as a Domestic Heater

of how some of the inhabitants of Southern California heat their water for domestic purposes. Any plumber can joint the 3-ft. lengths of pipes, as shown, and instead of supporting it by a scaffold, the heater is often placed on a roof having a southerly exposure. In addition to the system of pipes, a shallow glass-covered box is used, both the pipes and the interior of the box being painted black. In warm climates, this inexpensive device insures a supply of water hot enough for all household uses.

TESTING WHEELS FOR SIDE SLIP

It will be news to most people that wheels for automobiles can be tested in the factory before ever being applied to the vehicle. Machines have been devised to imitate all kinds of rough usage such as wheels have to withstand on the road, and, in the best factories, each new design is subjected to an exhaustive series of tests before being approved. These tests have

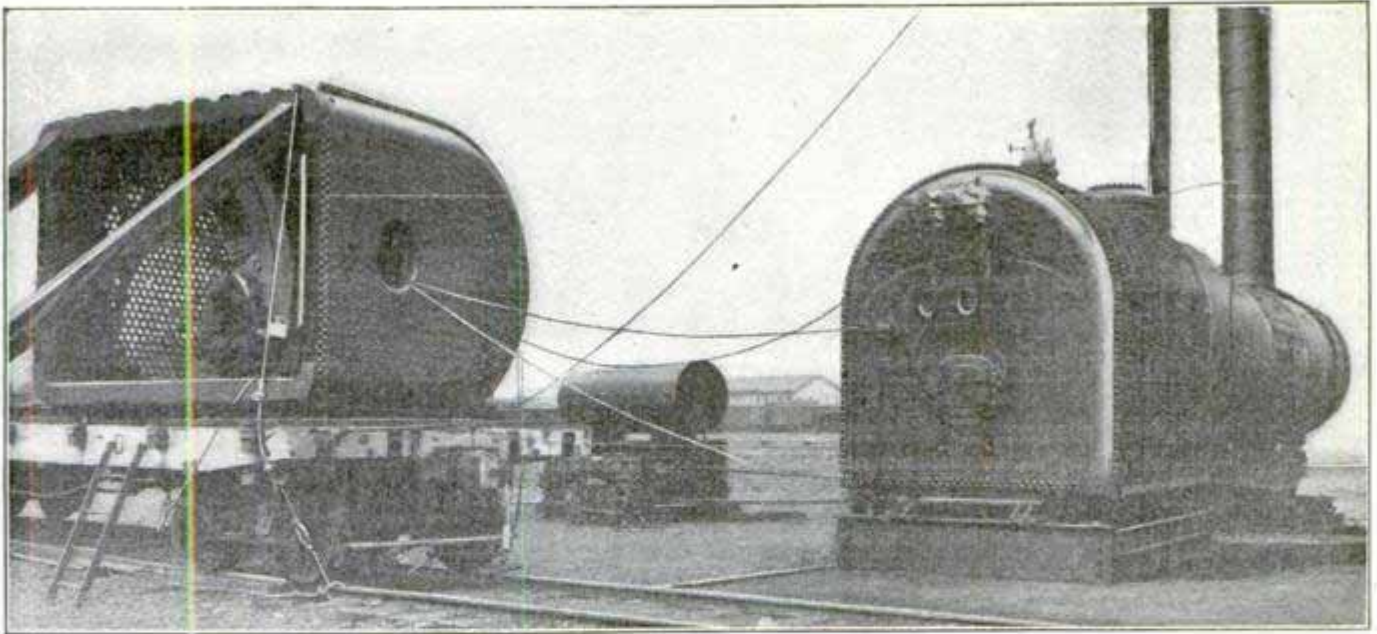
given valuable data as to the best designs and materials for the rims, spokes and hub shells, and have greatly influenced foreign manufacturers in favoring the wire-spoke wheel, which is said to have stood up better under test than the wood wheel. In one testing machine there is a heavy bob, weighing 500 lb., which swings at the end of a 12-ft. pendulum and so delivers a heavy blow to the rim of the wheel. Another machine is adapted to imitate the forces that an automobile wheel experiences when the vehicle rounds a sharp curve at very high speed or is subjected to a bad side slip.

DIAMOND "ANKLET" AND HAREM SKIRT

Kitty Gordon, the actress, is here shown wearing two of the latest styles, one being the harem skirt, and the other one of the new "anklets," which, it is said, may become popular this season. The "anklet" is composed of 25 large diamonds.



The Diamond "Anklet" may Become a Popular Fad



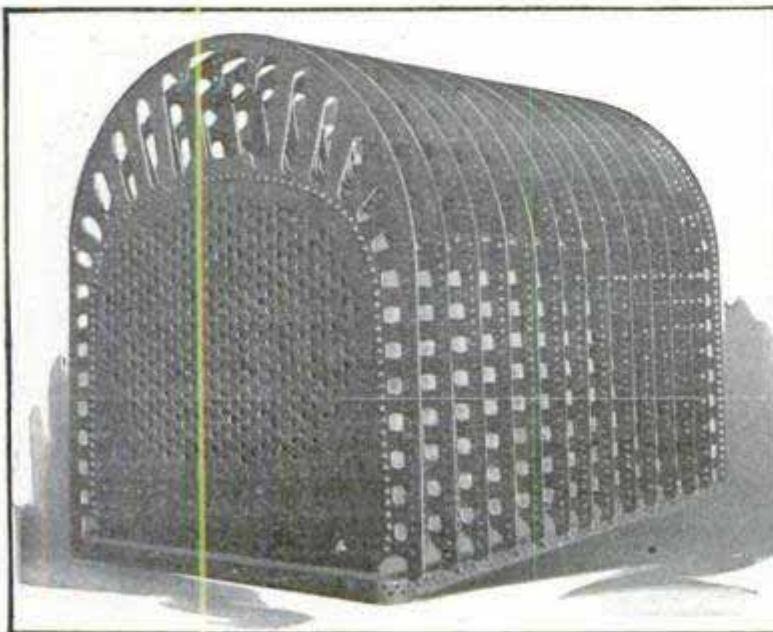
The Firebox under Test—The Firebox on the Flatcar, Cabled to the Track and Braced with Beams, was the Shield for the Man Making the Test

REMARKABLE TEST OF LOCOMOTIVE FIREBOX

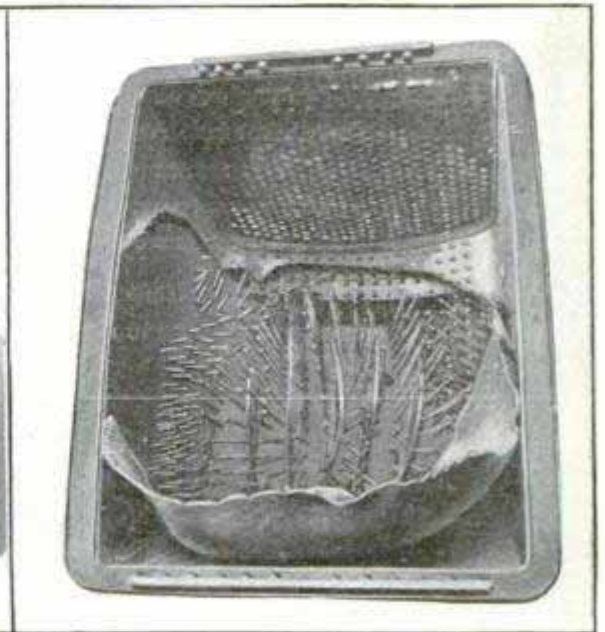
With the object of testing the value of the Jacobs-Shupert type of locomotive firebox under conditions that would cause a violent explosion with the ordinary firebox, the Atchison, Topeka & Santa Fe Railroad conducted a remarkable experiment at its Topeka shops.

The test was made on a piece of land at a safe distance from the buildings, and was witnessed by railroad and government officials who were enabled to watch the water levels and

gauges by the aid of field glasses. The two men taking the readings were positioned very close to the boiler in a shelter formed by a firebox loaded on a flatcar, both secured to the track by cables and the latter braced by beams as an additional precaution against danger from explosion. From the fire door of the firebox, a plain view was obtained of pressure gauges and water glasses, and the temperatures were registered by means of two pyrometer couples inserted in the



The Section Firebox under Construction



Ordinary Firebox after a Disastrous Explosion

steam space of the firebox, the leads of which entered the shield through its fire door as shown.

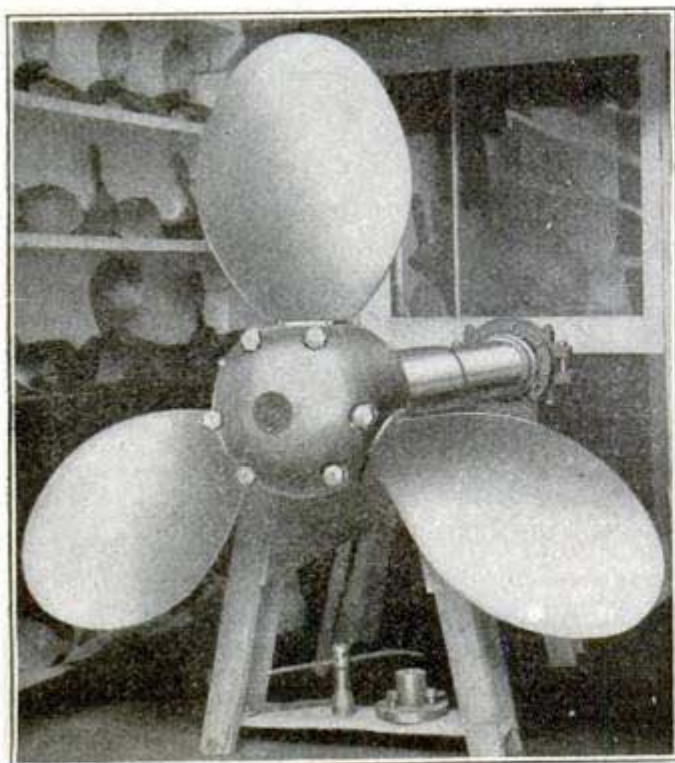
The boiler was fired by oil, and compressed air was piped to the stack to maintain combustion and keep up the boiler pressure. The boiler was fired for a considerable period before the actual tests, the pop valves blowing off intermittently with the boiler pressure at 225 lb. When the water dropped to about an inch above the crown sheet of the firebox, all the witnesses retired to the place of observation, and the water was lowered to the top of the crown sheet. During the following three minutes it was lowered 4 in. below the top of the crown sheet, at which time the firebox showed effects of expansion due to the heating, very slight openings occurring near the middle of the firebox. The crown sheet heated up gradually at an average rate of 76 deg. per minute for 10 minutes, at the end of which time the temperature of the front section, as indicated by the pyrometer, was 1,125 deg., and that of back section, 1,065 deg. The pressure, as shown by both gauges, was 230 lb.,

although all the pops were blowing off, and the water level was 6 in. below the top of the crown sheet. Toward the end, all of the crown sheet was bare and a large amount of red metal exposed.

Then the signal was given to start the pump, and water at 60 deg. was forced into the boiler and the fire cut off. After the firebox had sufficiently cooled, inspection showed no distortion of sections nor opening of seams, but indications of an overheated crown sheet such as would have caused a violent explosion in a firebox of ordinary construction.

The tests conclusively proved that the sectional firebox is stronger than the ordinary firebox with sheets held together by staybolts. The Jacobs-Shupert type of firebox is without staybolts, the firebox proper and the outer shell each being composed of pressed-steel channels, bent to horse-shoe shape and riveted together through the flanges. The largest locomotive in the world, illustrated in a previous issue of this magazine, is equipped with this type of firebox.

AN EXCEPTIONALLY LARGE REVERSIBLE PROPELLER



2,000-Lb. Propeller, the Blades of Which are Reversed by Air Pressure

Reversible propeller blades are not new, many motorboats being so equipped, but the reversible propeller shown in the illustration is exceptionally large, being 82 in. in diameter and weighing close to 2,000 lb. It is claimed to be the largest propeller with air-operated reversing blades in the world, and was constructed in Seattle, Wash., for the 900-ton barkentine "Archer," which is to be driven by a marine producer-gas installation. The reversing of the blades is accomplished by means of a casing which slides fore and aft over the propeller shaft. Compressed air is utilized to move the casing back and forth, the air control levers being mounted on a standard near the throttle of the engine, so that they can easily be reached by the engineer.



Theoretical Perils of Progress

By WALLACE IRWIN

"I NEVER see no doggoned use in Science or Invention, sir,"
Said Uncle Ebenezer in a pessimistic vein.
"They seem to be created with deliberate intention, sir,
Of makin' nations mischief and a-causin' people pain.
Now look at that contraption what they call the Maxim Silencer
Say, what is to prevent a man from hidin' in a street
And shootin' people quiet, bleedin' corpses fairly pilin', sir,
Him lurkin' undiscovered in his dangerous retreat?"

"There's *nothin'* to prevent it," answered Uncle Dan'l Dill,
"Yet that crime ain't never happened, and I don't believe it will."



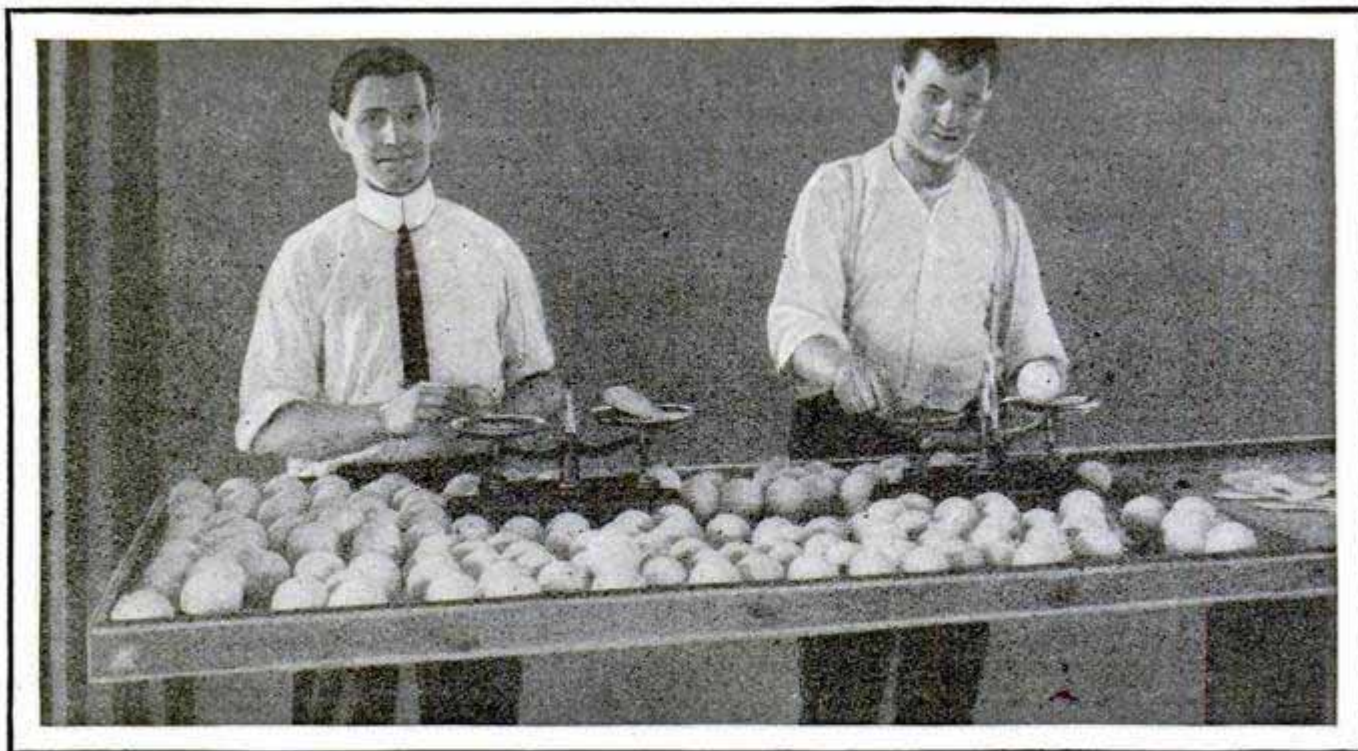
"I never seen no doggoned use in them there things called airypplanes,"
Said Uncle Ebenezer, "they're a menace and a blight.
For what's to keep a feller settin' on them high and scary planes
From smugglin' furs and silks and jools from Canada by night?
Or what's to keep some feller what's intent on loot and robbery
From landin' on a house-top and a-crawlin' down the flue
And takin' all the silverware with cool and skillful jobbery
Then disappearin' quiet in the region of the blue?"

"Oh nothin' I can think of," chuckled Uncle Dan'l D.,
"But I don't see no one tryin' it—and that's enough for me."

"They ought to have a law agin them gol-dinged wireless stations, sir,"
Said Uncle Ebenezer as he bit his plug of brown,
"Them volumes of electric sparks a-whizzin' o'er the nations, sir,
Is apt to light the atmosphere and burn Creation down.
You bet if I w s runnin' things I'd squelch a powerful lot o' truck;
The submarine, the slot machine, the turbine engineer,
The soul-destroyin' cotton-gin, the man-destroyin' auto-truck—
We'd all go back to Nature if I owned the world a year."

"It's sort o' darn consoln'," murmured Uncle Dan'l Dill,
"That folks like you *don't* run the world—and I guess they never will."





Every Baseball is Carefully Weighed before It is Sent Out of the Factory

HOW BASEBALLS ARE MADE

Some Interesting Facts about the New Cork-Center Ball

IN view of the recent heavy hitting in the professional baseball leagues, due to the adoption this year of the new cork-center ball, it will be interesting to take a peep into the heart of a great Philadelphia factory where no less than six million baseballs are turned out each year, and follow the processes involved in making this little understood but most necessary article of the American national game. Outwardly the ten-cent ball bears a close resemblance to the dollar ball, but, as every boy knows, there is a vast difference in the "life" and durability of the two spheres, the reason for which will be quite apparent when the process of manufacture is known.

The center of the cheap ball is made of ground-up carpet rags closely pressed into a core by machinery. Over this core string is wound—a very little string compared to the quantity used in winding one of the professional league balls—and then the unfinished article is sent to the room where the women sewers put the cover on, the

seam being drawn together by hand. It takes one of the sewers about eight or nine minutes to finish a seam. The ball is placed in a small wooden vise and the sewing is done with long needles.

But the league ball is a very different product. In the first place, the construction of this ball has been undergoing an evolution for years. At the present time there is much complaint from some who would have few runs and a quick game, on account of the way in which the batters are hitting this new cork-center ball. The complaint is heard that the ball is too fast and runs too frequent. The explanation of the experts is that a ball hit on the ground with the new ball is no faster than with the old one, but that a ball hit in the air goes farther, thus accounting for the great number of extra-base hits made in recent years.

Some years ago, the balls were made with rubber centers. Then, in response to a demand for more runs to make the game interesting to the spectators



Sewing the League Baseballs—Done Entirely by Men



Case of Baseballs Ready for Shipment



The Cheaper Baseballs are Sewn by Women



Stamping and Boxing for Shipment

the experiment was tried of making a ball with a small piece of cork in the center, in the heart of the rubber core. This produced a little of the desired effect, and every year from that time the relative sizes of the rubber and the cork in the center of the spheres has been changed until the present fast ball was evolved. Some think it is entirely too fast, the greater number of runs made with it lengthening the games so that spectators complain of the lateness of the hour at which the games are finished.

The winding of the ball is done by machinery. In the old days, when baseball first began to claim widespread attention in this country, the balls were wound by hand and a skillful and fast workman could wind perhaps 18 balls in a day. Now a single machine will wind several hundred balls in an hour, and the balls made today are vastly superior to the clumsy spheres made in the early days of the game.

The man attending one of the winding machines first places in position one of the rubber and cork cores, weighing just 1 oz. Then he starts his machine and the core is quickly hidden in the winding twine. When the machine is stopped, the core is covered by 2 oz. of gray woolen twine. The sphere, which now weighs 3 oz., is then sent to another man who adds to it 1 oz. of white twine. Then the final winding is done with gray twine. The

ball by this time is exceedingly hard and compact.

It is now ready for the cover. None of the high-priced balls are intrusted to the women. All the sewing on these balls is done by men. Prior to the cover being sewn on, the balls are carefully weighed and when the covers are stitched in place the balls are transferred to the labeling room where they are packed in tinfoil and stowed in pasteboard boxes ready for shipment.

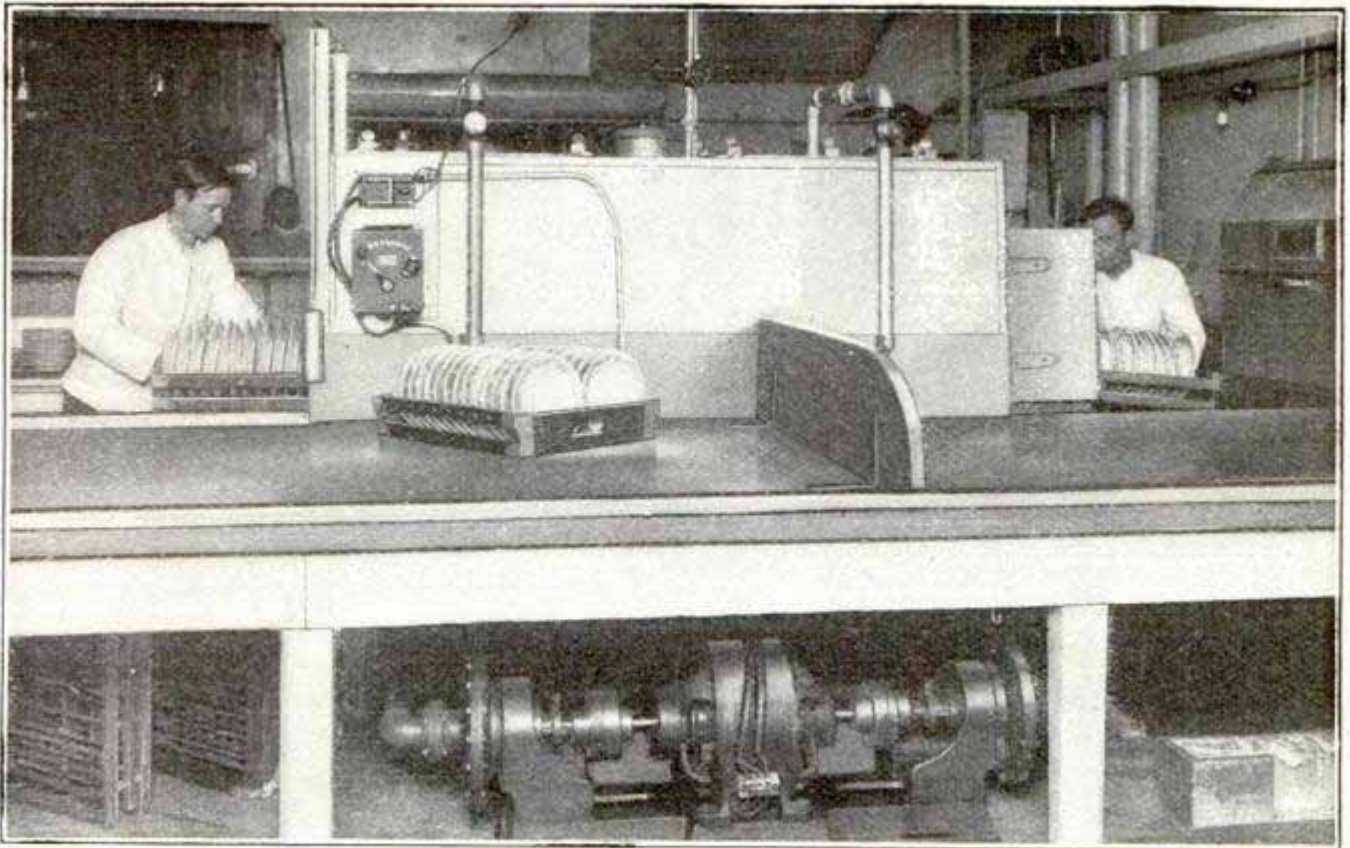
A visitor to one of these factories will be likely to think that the work is not taken very seriously, for in the lots adjacent he will find some of the workmen, boys and men, apparently engaged in a game of ball during working hours. This is actually part of the day's work, for the balls are given a trying out by being turned over to some of the employes and taken out to be practised on. A baseball is a delicate piece of workmanship. The least thing affects its usefulness, and whenever a slight change is made in the construction or some improvement is contemplated, the ball must be tried by those who are competent to judge from the touch of the bat to a pitched ball just how it is going to respond when hit. As there is no better way of testing than by actually playing with the ball, the final judgment on a new product is left to the men who are sent out to play ball during working hours with a view to trying out the new sphere.

EFFECT OF ELECTRICITY ON SCHOOL CHILDREN

A rather remarkable experiment has been carried on for some years in one of the public schools of Stockholm, Sweden, to test the beneficial influence of electricity on the development of the human body. Two groups each of 25 children, as nearly alike as possible in general health, and size and weight of the individuals, were given instruction in two rooms, both being equal in size, ventilation, lighting and exposure. But the group in one of the rooms was continually exposed to the influ-

ence of electric currents, while the other group was not.

Now, after three or four years of the tests, it is claimed that the "electrified" children have outstripped the other group, growing faster, putting on weight quicker, developing better appetites and showing more physical resistance. As a whole, the mentality of the electrified group was also greater, as backwardness in the majority of cases is the result of some physical defect.



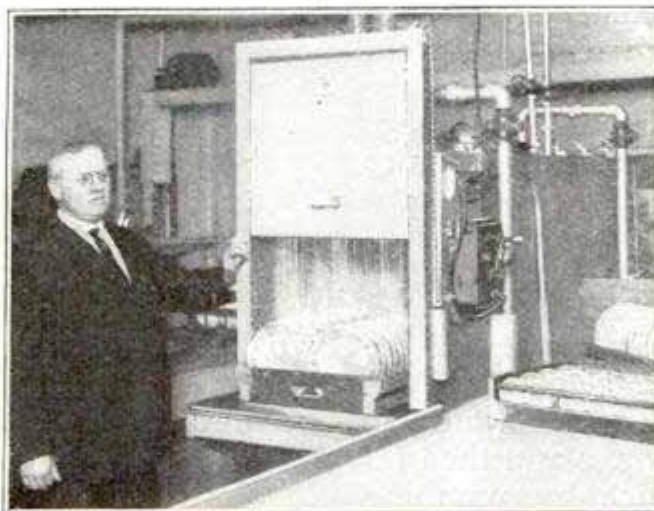
Dish-Washing Machine Which can Clean and Dry 18,000 Dishes an Hour, Showing How It is Operated by Two Men, One Pushing in Racks of Dishes, the Other Taking Them Out—Motor in Foreground

MACHINE WASHES 18,000 DISHES AN HOUR

The never-ending washing of dishes is probably the greatest bugaboo of housekeeping. Likewise it is one of the greatest troubles of the steward of the large hotels. It is necessary to wash them thoroughly as well as quickly, for guests will not tolerate dishes that are not spotless. Louis A. Haustetter, the steward of the Hotel La Salle, Chicago, having wrestled with the dish-washing problem for years, has devised a machine which can wash and dry over 18,000 dishes an hour when operated, by two men, at full capacity. In practice, however, only one man is needed, as it is rarely necessary to wash so many dishes, even at the largest hotels.

The machine consists of a rectangular chamber of galvanized iron, large enough to hold three racks of dishes, such as are shown in the illustrations. When the racks are placed inside and the doors at the ends closed, the dishes are struck by hundreds of jets of boiling hot water under pressure. The box is also filled with steam, thus insuring thorough sterilization. The doors at the ends are then opened and another rack put in, pushing out the rack at the opposite end. The dishes dry almost immediately by the evaporation of the water.

Hot water is pumped into the washer by a 3-hp. motor at the rate of 125 gal. a minute, but as this water is used



Receiving End of Dishwasher, Showing Jets of Water Striking Dishes—Inventor Stands beside It

over and over again, each time passing through a filter, the actual consumption of water is only $\frac{1}{2}$ gal. a minute.

A NEW AUTO HORN

A neat and compact loud-sounding automobile horn or chime, with the



Auto Horn with Inner Ends of Tubes Open

four tubes fastened around a solid central bar and with the inner ends of the tubes open, has now been placed on

the market. Flattened nozzles, one for each tube, convey the pressure into the tubes. The leaving of the inner ends of the tubes open prevents their clogging up, and makes possible a clear, loud note.

Two types of heads are provided, one of which converts the horn into a multitone affair, while, with the other, only one blast is given.

¶ Economy in the operation of the power plants of neighboring manufacturing concerns is obtained in some parts of Europe by interchanging electric power to help out one another when the demand for power in any of the factories rises above normal.

AUDACIOUS PLAN TO EXTEND NEW YORK CITY

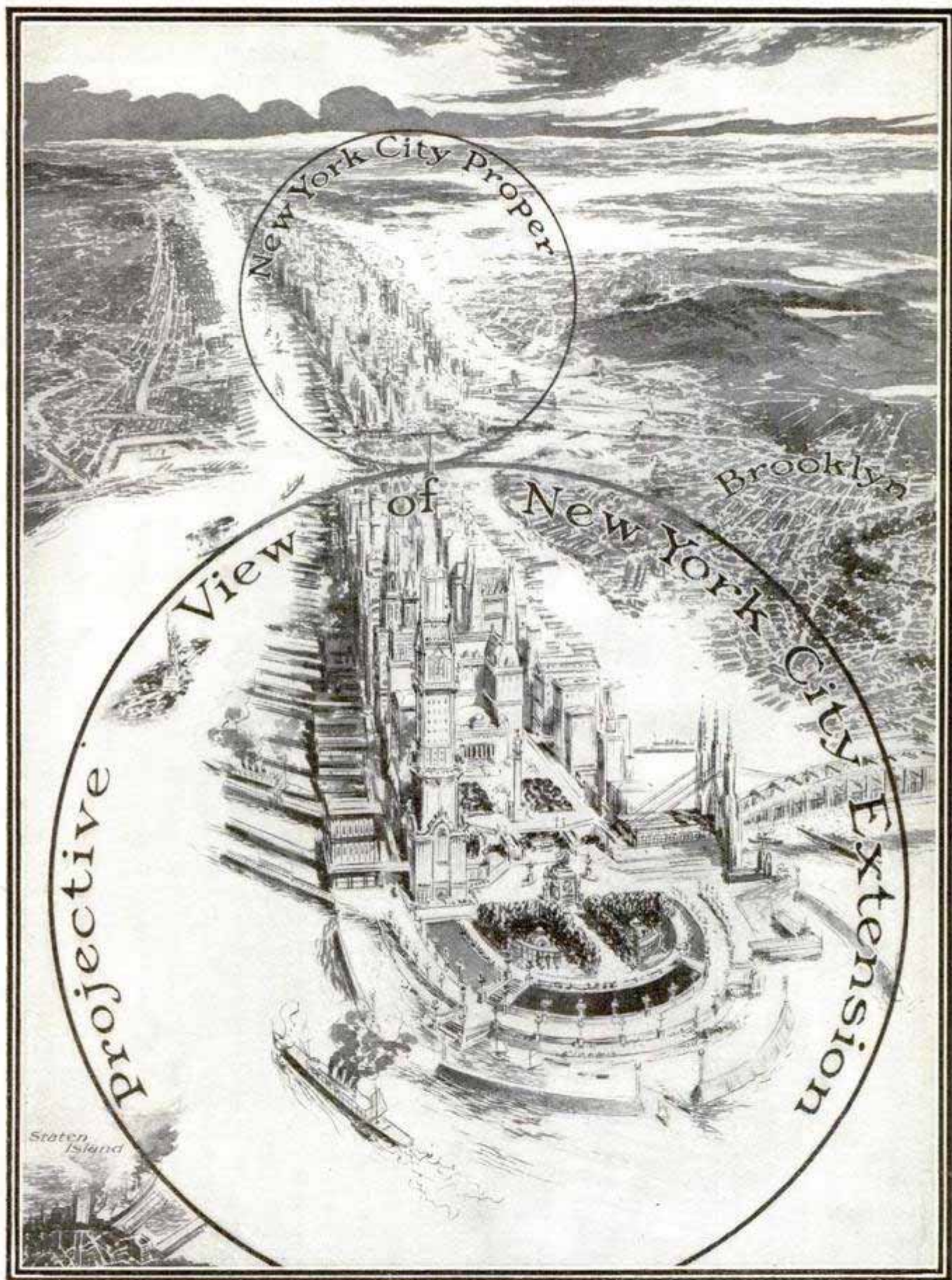
Probably the most astonished man in New York City on April 5 last was Mayor William J. Gaynor, when he found in his mail a letter from T. Kennard Thomson containing the daring suggestion to build out the city from the Battery toward Staten Island for a distance of about four miles, and thus at one stroke solve the questions of New York's shipping, freight and land congestion in the business end of Manhattan Island. At first sight, the scheme would appear to be an attempt to outrival the wildest dreams of a Jules Verne or a modern press agent, but Mr. Thomson is an engineer who has done things which entitle him at least to serious consideration, and he is not alone in the belief that there are no obstacles of an engineering nature to prevent an absolutely safe and economical construction.

The plan, in brief, is as follows: To build substantial, concrete sea walls a little over half a mile apart from the Battery toward Staten Island for about four miles; between these walls to place two 4-track subways and then fill in the remaining space by pumping sand out of the channels; to build docks out from the sea walls, as required;

from the end of the new-made line to Staten Island, to construct an 8-track tunnel, and then encircle Manhattan and Staten Islands with 4-track tunnels big enough to accommodate full-sized freight cars.

The proposed addition is equivalent to an area from the Battery to 42nd Street in length, by 10 blocks (north and south) in width, and comprising about 1,400 acres. The present depth of water on the site is from 20 ft., near the Battery, to 60 ft. near the Staten Island end. Where rock occurs within 100 ft. of the water surface, pneumatic caissons could be sunk and the inclosed area pumped out for foundations. Where rock cannot be reached at this depth, piles could be driven and cut off many feet down, and then caisson sea walls could be sunk on top of the piles, and the intervening space filled with sand pumped out of the channels. Governor's Island would, of course, be included in the new city.

One obvious advantage of the scheme is the fact that subways and foundations for buildings on the reclaimed land would not necessitate any excavation; they could be provided for



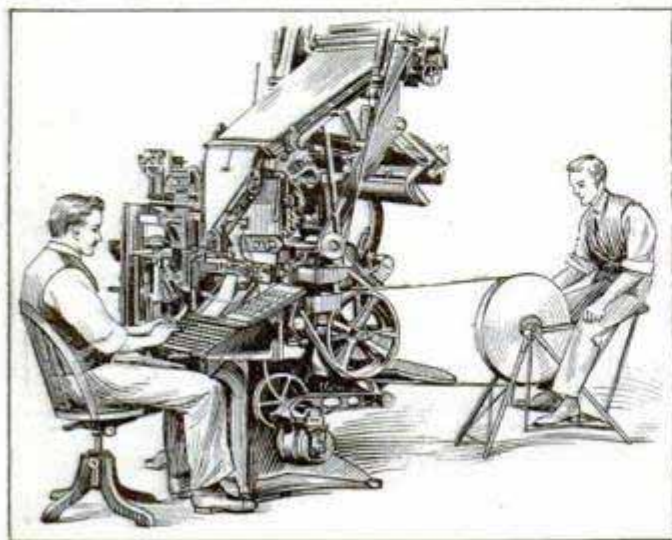
New York City as It Might Appear if the Proposed Scheme to Extend It Four Miles Out from the Battery is Put into Effect

before the made land was filled in. Furthermore, it would be possible to secure whole blocks for skyscrapers and

ample room for parks and open spaces, an obvious impossibility in Manhattan Island as it exists today.

GRINDSTONE DRIVES TYPE-SETTING MACHINE

Recently, when the electric power plant at Kirksville, Mo., was put out of commission by a storm, a ball-bearing grindstone was belted to the



Very Unusual Task for a Grindstone

linotype machine of the local newspaper and used as a means of transmitting foot-power for its operation. The pedal power was furnished in shifts, the type-setting machine being operated in this manner an entire day.

AUTOMOBILE FORT FOR FRENCH ARMY

Of the recent automobile mechanisms acquired by the French army, the most interesting and unique is this 40-



One of the 40-Hp. Automobile Forts of the French Army

hp. moving fort. The armored body of the machine is divided into three compartments, the first of which is for the chauffeur. The central compartment, provided with long loopholes, is for the soldiers, and the rear compartment is used for the storage of ammunition, supplies and a quick-firing gun. The armor plates are so constructed that they can be easily taken apart when repairs are necessary.

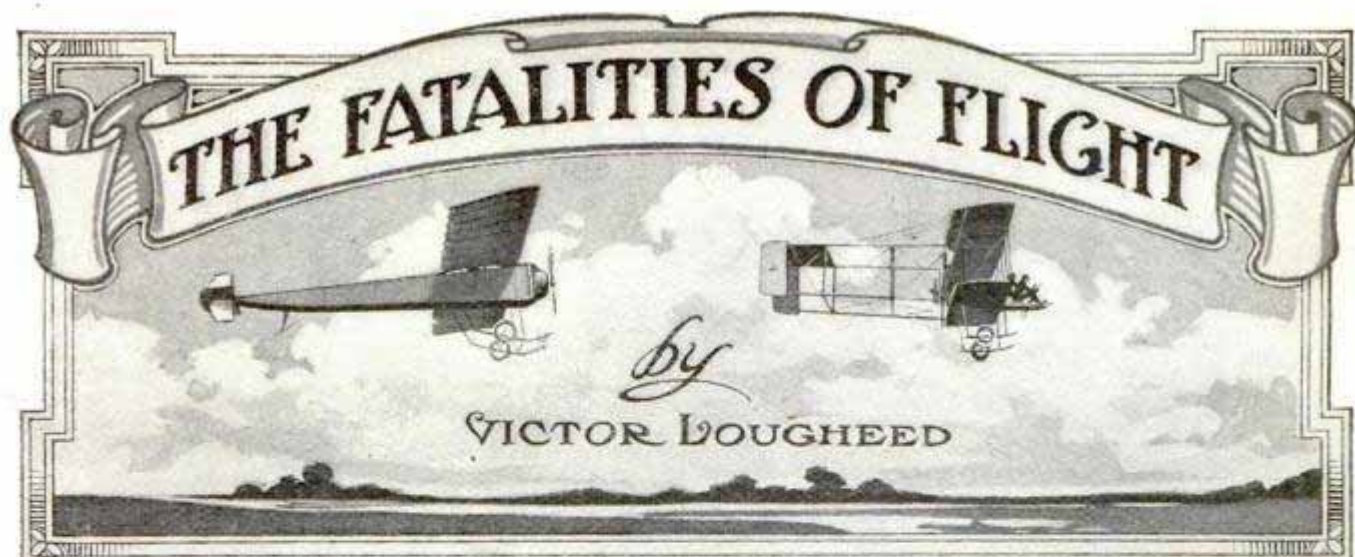
GASHOLDER MOVED BODILY BY RAIL AND SEA

An old gasholder, 45 ft. in diameter and of 40,000 cu. ft. capacity, was recently moved bodily a distance of over 2.5 miles instead of being taken apart and re-erected. This occurred during the building of a new gas works at Helsingfors, Finland.

The holder was raised and placed on an inclined four-rail track, and slid down to the sea, a distance of 200 ft. Then it was towed 2.5 miles by a tug to the new site, where it was beached at high water and pulled up an incline into position. The total cost of removal was about \$1,500.

THE TIN-CUP MOSQUITO TRAP

A simple and effective mosquito trap, well known in every mosquito country, consists of a tin cup or tin can attached to a long stick in such a manner that a spoonful or so of kerosene can be placed in it. The cup or can is then pressed up to the ceiling so as to inclose one mosquito after another, the fumes stupefying the insects and causing them to fall into the kerosene. It is often only necessary to hold the cup merely an inch or two below the mosquito, the fumes being effective at that distance.



SINCE the first section of this article was published,* the fatalities of flight have, as was therein predicted, been added to at a much lower rate than would be in proportion to the rapid increase in flight mileage. Twelve more brave men have gone to their deaths in the cause of human progress, but in the advancement of the month is their undying justification. Their fate has been the excuse for renewed outbursts of popular clamor against the aeroplane, and wild demands for fool legislation. But the world moves on, and the men who are fighting a winning fight with the vagaries of the air, fully realizing its difficulties and courageously grappling with its dangers, can well afford a serene disregard for the type of deeply ignorant, however multitudinous, opinion that can revel in the glories of war, pass by without pause the carnage of poor sanitation and unregulated industry, and then rise to hysterics because some individual with more brains and courage than it can understand can give his life, not merely to his country, but to all mankind.

The men of the air, who are winning success in the most difficult of all difficult fields of engineering, are assuming their own risks and are their own best judges of restrictions and precautions. Attempts to hamper them not only constitute a rare presumption, but will prove so futile as to be ridiculous.

Aviation, considered as a sport, and wholly disregarding the prospect of its assuming vast industrial importance, is even less dangerous than football. Statistics compiled concerning this game, as played by American college teams, show that of the membership of some 200 football elevens, totaling some 2,500 players, 60 were killed during 1909—a mortality considerably higher than the present annual maximum of 37 men killed in aeroplane accidents, from May 15, 1910, to May 15, 1911, out of a total of about 2,000 licensed and unlicensed aviators.

A strikingly significant fact, bearing out the writer's contention in the first paragraph of the following, is the total of only four deaths among some 8,000 passengers who have been carried in aeroplanes. Naturally enough, when it is considered, passenger flights involve well-tested machines, and tend to be carefully conducted.—THE AUTHOR.

IT is most manifest that very nearly all the aeroplane accidents so far have been clearly due to careless construction or assembling, to flying under bad conditions of wind or locality, to incompetent driving, to distinctly reckless exhibition stunts, or to clumsy experimenting.

How incontrovertibly this is the case will be more apparent from a brief analysis of the accompanying table, which includes all aeroplane fatalities to June 21, 1911.

From this it is to be noted that six of the accidents are not really flight accidents in any

proper sense of the terms. Ferber and Michelin both were in machines that were running on the ground when they were smashed up—quite as an automobile might have been smashed up. Picollo was not even in his aeroplane when killed, but, while on the ground,

trying to prevent the machine from running into a ditch, was literally run over by it, and died from a fracture of the skull occasioned by a blow from the tail. Le Blon, Grace, and Lieut. Bague drowned—the first being held a few inches under water for eight minutes before help could reach him, the others by losing



The Machine in Which the Two Morane Brothers Were Badly Hurt, Suggesting How Protection Might Have Been Afforded by a More Substantial Housing

*The first part of this article was published in the July issue

themselves and machines in the North and the Mediterranean Seas, respectively.

Of the remaining 53—in addition to five of those just mentioned—it is reasonably certain that at least 24, including Selfridge, Lefebvre, Delagrangé, Rolls, Van Maasdyk, Poillot, Plockmann, Blanchard, Saglietti, de Caumont, Moisant, Stein, Cei, Liete, Purves, Hardle, Bournique and Dupuis, Benson, Smith, Pennot, Weisenbach, Princetau, Le Martin, and probably several others, could have been saved unhurt, or at any rate not fatally injured, had they been in machines provided with adequate housing and protection for the operator. By this is meant not merely a seat and a belt to prevent falling out, with perhaps an embryo cockpit, but a real inclosed body, probably with a canvas and pneumatic-mattress lining,

in addition to such engine placing and general arrangement as would minimize the danger of being crushed by the motor and compel the preliminary breakage of a maximum amount of

overhead, wing, head, tail, or understructure, before the damage could extend to the operator.

It is perhaps only natural that the first attention of the flight engineers should have been given to flight problems rather than to the specific protection of the aviator, but signs are not wanting that one of the next developments will be in the direction of improved passenger accommodations from the standpoint of safety as well as of comfort.

Several European designers are already experimenting with semi-inclosed seats, and from this to a sort of conning-tower roof in addition is only a short step. For oversea flight, such accommodations should and can

be easily made to include the provision of floats or, better, of a boat-like body sufficiently buoyant to allow at least a reasonable hope of rescue. It is to be remarked in this connection that Bleriot, when he crossed the English Channel, piloted a machine in the fuselage of which there was installed a large cylindrical float of rubberized fabric.

Upon first consideration it may seem remarkable that so large a proportion of aeroplane accidents should involve such moderate falls that the protection of the operator is within hope of attainment. But the



Latham in the 100-Hp. Antoinette Monoplane, Showing the Peculiar Padded "Cuirasse"



A Type of Exceedingly Dangerous Machine in Which the Operator is Too Close to the Ground—This Type is Disappearing

fact is not so remarkable as it appears. Accidents to aeroplanes, even though they may involve in a secondary way the personal equation, in the form of recklessness or carelessness, or faults in the machine such as instability or insufficient strength, are apt to have for their primary cause such disturbances in the air as make for miscalculation or impose undue stresses, and these breakers and gusts and eddies in the atmospheric ocean are now well proved to exist in most serious degree close to the ground—in the neighborhood of the buildings and trees and hills and other terrestrial irregularities that constitute the shores of the invisible sea the aviator must navigate. The upper atmosphere, except for steady wind flows that are not seriously disturbing to the aircraft traversing them, are known to be comparatively quiescent.

A common analogy exists in water navigation. It requires little ability to handle rudder and sails in the open ocean, but to pilot a vessel on a lee shore, with wind and reefs and breakers all to fight against, the most accomplished skill of the navigator is none too secure a safeguard against shipwreck.

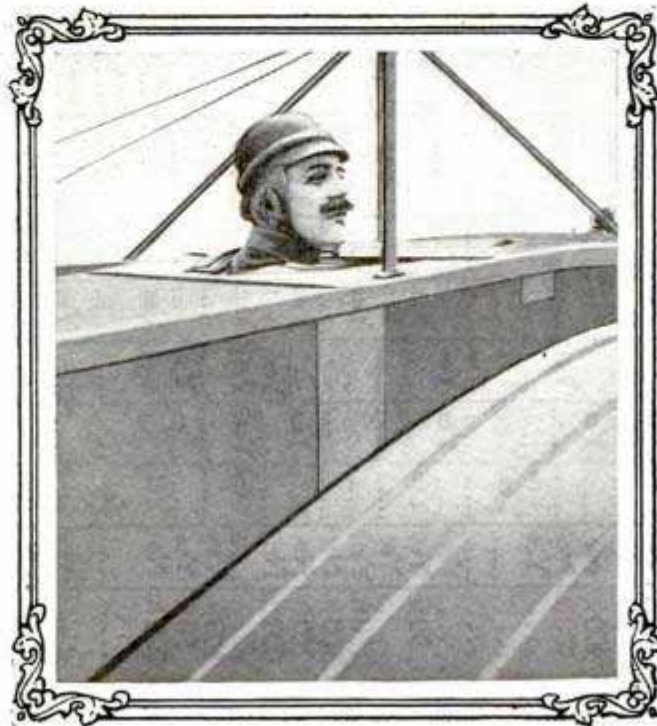
Of the 27 aviators who were killed by falling from heights so great that they probably could not have been saved by any different arrangement of the protecting structure of wood and wire and fabric surrounding them, in the cases of

five, Rossi, Fernandez, Purves, Hardle, and Weisenbach, death resulted from first experiments with new machines, of questionable safety, and of types of which they were the only examples. In

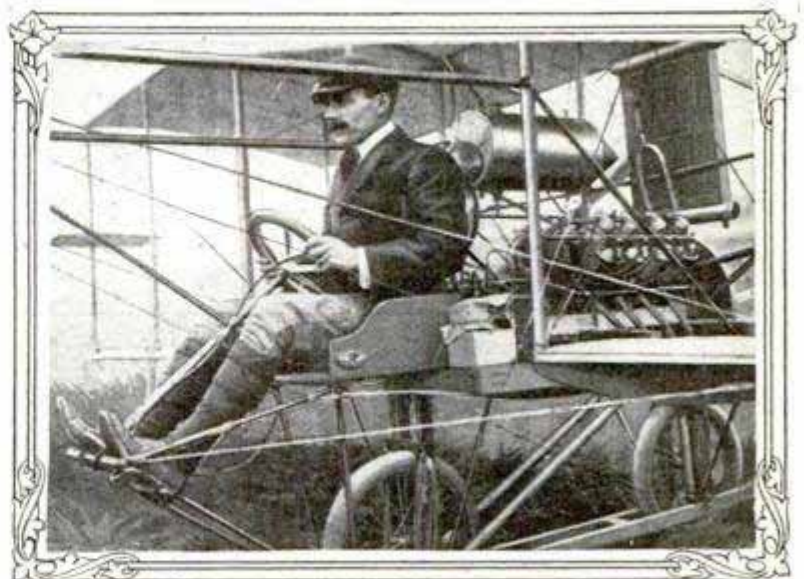
the case of one other, Captain Madiot, this was absolutely the first flight by this pilot, and its recklessness was such as to give rise, in conjunction with personal disappointments that make the theory seem tenable, to the opinion that the driver may have intended to commit suicide.

Of the 24 remaining, the accidents were in 12 cases—those of Wachter, Haas,

Johnstone, Cammarota and Castellani, Laffont and di Pola, Russian, Kelly, Cirri, Princetau, and Lendron—rather clearly to be ascribed to failure of vital parts of the machine, of such character as to be as inexcusable as, and not necessarily more dangerous than, the failure of an automobile steering gear.*



The Airman's Position in the Nieuport Monoplane, Showing How Well the Operator is Protected



As in the Machine Shown on the Opposite Page, This Operator Would be Crushed by the Motor in a Slight Fall

*It is to be understood, of course, that such failure is as likely to be due to carelessness in shipping and assembling as to fault on the part of the manufacturer

| No. | Name | Place of Accident | Date | Machine | Distance of Fall | Avoidable by Housling | Control. Failed. | Wing Broke. | Driver Incompetent. | Driver's Experience. | VOL. PLANE. | Wind. | Remarks |
|-----|--|---|---------------|------------------|------------------|-----------------------|------------------|-------------|---------------------|----------------------|-------------|----------|---|
| 1 | Lieut. Thos. E. Selfridge. | Fort Myer, Va. | Sept. 17, '08 | Wright, B. | 80 ft. | Yes | Yes | | | | | | First flight after lengthening propeller blades. Blade supposed to have chipped rubber wire. Only 10 ft. from ground. Was crushed by motor. |
| 2 | Ernest Lefebvre. | Juvisy-sur-Orge, near Paris. | Sept. 7, '09 | Wright, B. | 10 ft. | Yes | Yes | | | | | | Struck obstruction while on ground and was crushed by motor. |
| 3 | Enea Rossi. | Rome, Italy | Sept. 7, '09 | Rossi | | ? | | | | | | | Went up with control tied with string. |
| 4 | Capt. Louis Ferdinand Ferber | Boulogne-sur-Mer, France | Sept. 22, '09 | Voisin, B. | | Yes | | | | | | | |
| 5 | Antonio Fernandez. | Near Nice, France | Dec. 6, '09 | Fernandez, B. | 500 ft. | No | Yes | | | | | | |
| 6 | Léon Delagrèze. | Croix-d'Hins aerodrome, near Bordeaux, France | Jan. 4, '10 | Bleriot, M. | 60 ft. | Yes | | | | | | Yes | Gyroscopic effect of motor, with insufficient bracing, caused breakage. Was held 8 ft. under water for 3 min. No other wise hurt. |
| 7 | Hubert Le Blon. | San Sebastian, Spain | April 2, '10 | Bleriot, M. | 150 ft. | Yes | | Yes | | | | Yes | Struck mark tower while running on ground at dusk. |
| 8 | Hauvette-Michelin. | Near Lyons, France. | May 13, '10 | Antoinette, M. | | Yes | | | | | | Yes | Wind was very strong. Accident happened near ground. Machine ran up with wing soaked and machine held by rail when motor stopped. |
| 9 | Thaddeus Robl. | Near Stettin, Germany. | June 18, '10 | Aviatik, B. | | ? | | | | | | "High" | Machine had failed to glide when motor stopped. |
| 10 | Charles Louis Wachter | Near Rheims, France | July 3, '10 | Antoinette, M. | 500 ft. | No | | Yes | | | | Yes | Was close to ground. |
| 11 | Daniel Kinet. | Belgium | July 10, '10 | Farman, B. | 400 ft. | No | | | | | | | Said to have failed to glide when motor stopped. |
| 12 | Charles Stewart Rolls | Southbourne aerodrome, England. | July 12, '10 | Wright, B. | | Yes | Yes | | | | | Some | Said to have failed to glide when motor stopped. |
| 13 | Nicholas Kinet. | Stockel aerodrome, Brussels. | Aug. 3, '10 | Farman, B. | | Yes | Yes | | | | | "Strong" | Said to have failed to glide when motor stopped. |
| 14 | Lieut. Marquis Pasqua Vivaldi | Italy | Aug. 20, '10 | M. Farman, B. | | No | | | | | | | Wing. |
| 15 | Clement Van Maasdyk | Arnhem, Holland. | Aug. 27, '10 | Sommer, B. | | Yes | Yes | | | | | Yes | Lost control because of cold, or "mountain sickness," or broke from VOL-PLANE strain. |
| 16 | Georges A. Chavez. | Domo d'Ossola, Italy. | Sept. 22, '10 | Bleriot, M. | 30 ft. | Yes | Yes | | | | | Yes | Overturned by squall when near ground. |
| 17 | Edmond Poillot. | Near Chartres, France | Sept. 25, '10 | Savary, B. | | Yes | | | | | | | Said to have failed to glide when motor stopped. |
| 18 | Ernst Plochmann. | Habsheim aerodrome, Germany. | Sept. 28, '10 | Aviatik, B. | 150 ft. | Yes | | | | | | | Various attributed to wing breakage and motor failure. |
| 19 | Heinrich Haas. | Germany | Oct. 1, '10 | Wright, B. | 500 ft. | No | Yes | | | | | | Said to have collapsed machine by strain of VOL PLANE. |
| 20 | Capt. Leon M. Matzjevitch. | St. Petersburg | Oct. 7, '10 | Farman, B. | 1200 ft. | No | Yes | | | | | | Was first attempt at driving. Various ascribed to incompetence, suicide and breakage. |
| 21 | Capt. Louis Madiot. | La Brayelle aerodrome, France. | Oct. 23, '10 | Breguet, B. | 400 ft. | No | Yes | | | | | Yes | Said to have collapsed machine by strain of VOL PLANE, or else lost control. |
| 22 | Lieut. Wilhelm Mente. | Magdeburg, Germany | Oct. 25, '10 | Wright, B. | | Yes | Yes | | | | | Yes | Was crushed by motor. |
| 23 | Fernand Blanchard. | Issy-les-Moulineaux, near Paris. | Oct. 26, '10 | Bleriot, M. | 100 ft. | Yes | | | | | | | Mishandled elevator, jumped out, and machine fell on him. |
| 24 | Lieut. Guisepe Saglietti. | Centocelle parade ground, Rome | Oct. 27, '10 | Asteria, B. | 50 ft. | Yes | | | | | | | Warping wings probably broke from strain of evolutions. Tried to warp wings with hands. |
| 25 | Ralph Johnstone. | Overland Park, near Denver. | Nov. 17, '10 | Wright, B. | 500 ft. | No | Yes | | | | | | "Alleron jammed" according to most plausible theory. |
| 26 | Engineer A.E. Cammarota } Private S. Castellani } | Near Rome, Italy | Dec. 3, '10 | Farman, B. | | | Yes | | | | | | Flew in fog, and lost bearings. Neither machine nor body have been found. |
| 27 | Cecil Grace. | Lost in North Sea | Dec. 22, '10 | Short-Wright, B. | | Yes | | | | | | | On ground. Had jumped out to hold machine back. Tripped. Skull fractured on rock way absolutely. |
| 28 | Guillo Piccolo. | Sao Paulo, Brazil. | Dec. 25, '10 | Bleriot, M. | | No | | | | | | | Jammed steering wire, or "wing gave away absolutely." |
| 29 | Alexandre Laffont } Mario di Pola } | Issy-les-Moulineaux, near Paris. | Dec. 28, '10 | Antoinette, M. | 250 ft. | No | | Yes | | | | | Machine failed to steer when near ground. Bell broke, tumbling driver into front of machine. |
| 30 | Lieut. Jacques de Caumont. | Buc, France | Dec. 30, '10 | Nieuport, M. | | Yes | Yes | | | | | Yes | Ball broke, driver thrown out and crushed. |
| 31 | John B. Moisant. | Near New Orleans | Dec. 31, '10 | Bleriot, M. | | Yes | | | | | | | Had vol placed through great height. Probably lost control through mountain sickness. |
| 32 | Arch Hoxsey. | Near Los Angeles. | Dec. 31, '10 | Wright, B. | 500 ft. | No | | | | | | Yes | Propeller said to have burst, and machine was blown against house. |
| 33 | Eduard Russian. | Belgrade, Servia | Jan. 9, '11 | Russian | | | | | | | | | Struck ground through recklessly miscalculated VOL PLANE. |
| 34 | Lieut. Stein. | Doberitz, Germany | Feb. 6, '11 | Farman, B. | 65 ft. | Yes | | | | | | | Struck ground at too sharp angle through reckless VOL PLANE. |
| 35 | Jules Noel } M. de la Torre } | Douzy, France | Feb. 11, '11 | Sommer, B. | | | | | | | | | Motor failed, did not glide. |
| 36 | Joseph Cai. | | March 28, '11 | Caudron, B. | | Yes | Yes | | | | | | Machine overturned and operator crushed through attempting turn before clear of ground. |
| 37 | Lieut. L. Byasson. | France | April 14, '11 | M. Farman, B. | | | | | | | | | |
| 38 | Captain Edouard Tarron. | France | April 18, '11 | M. Farman, B. | 250 ft. | | | | | | | | |
| 39 | Louis Liete | Rheims, France | April 18, '11 | | 18 ft. | Yes | | | | | | | |

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Twelve accidents remain to be explained. In addition to probably not less than 10 or 12 of the preceding, seven of these 12—to Chavez, to Matievitch, to Mente, to Hoxsey, to Noel and de la Torre, to Benson, and to Smith,—occurred at the termination of a *vol plane*.†

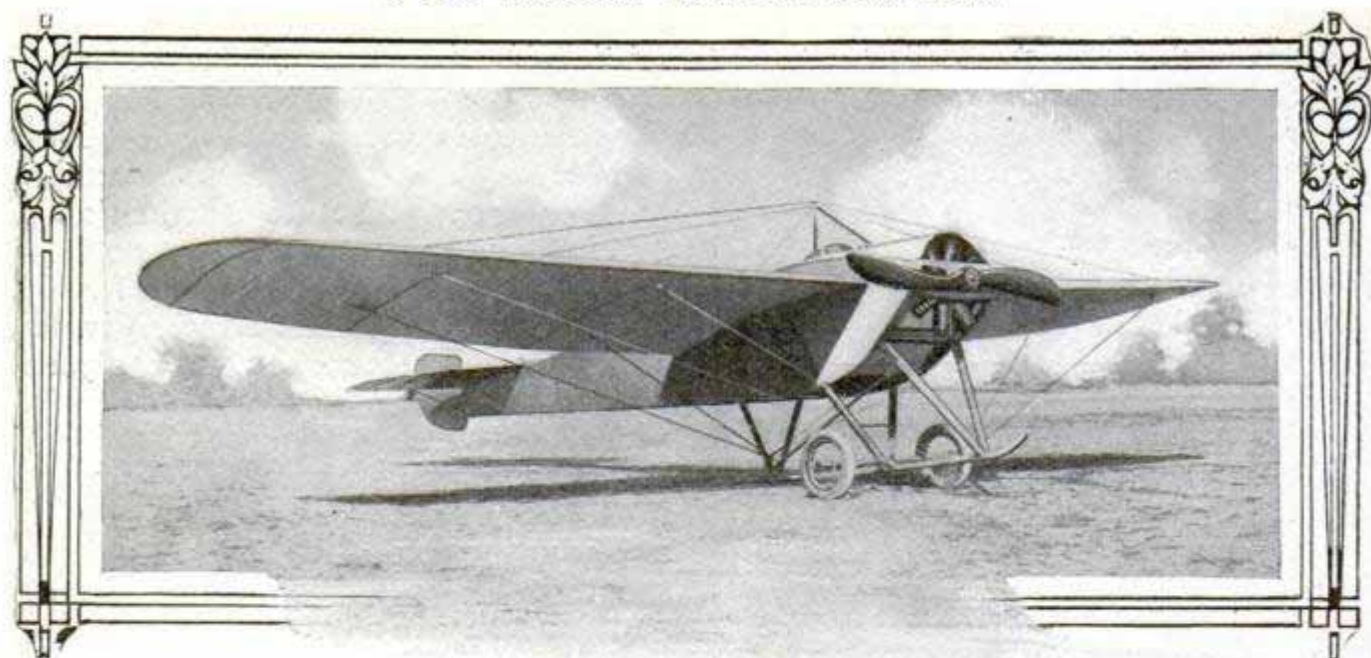
This leaves only the deaths of Robl, Daniel Kinet, Nicholas Kinet, Vivaldi, Tarron, and Liete to be reasonably explained as possibly avoidable with proper caution. Of these, Robl was flying in a dangerously strong wind, against his better judgment, to satisfy a clamoring crowd that had paid to see a flight exhibition. The Kinets and Vivaldi are all said to have lost their heads and failed to glide when the motor stopped—a danger that is present only in machines not possessed of a degree of inherent stability that has been proved to be as readily attainable as it is desirable.

One of the curiosities of aviation accidents is the number of deaths that have not occurred—if the bull may be permitted. At different times the writer has read in the American press the obituaries of Breguet, Prince Popoff, de Baeder, Duray, Barnes, Raymond de la Roche, Legagneux, Peeters, and others, all more or less well-known European aviators who at this writing are alive and well. Similarly, in European papers, the deaths have been reported of Brookins, Ely, Dr. Walden, Hamilton, and others of the American aviators who are most emphatically in the land of the living.

A most persistent intruder in the death lists is "Aladan de Zsely" (also spelled Zosely and Zoseley) who was said to have met his death near Budapesth on June 2, 1910. A diligent search for the origin of the account, and considerable correspondence, have failed absolutely to discover any authentic evidence of such an aviator.

A most unscrupulous canard, that originated in the United States, concerned one "Walter Archer," of Salida, Colorado, a youth who was very circumstantially reported to have built an "aeroplane" that took its power from

†The swooping dive from a height, terminated by resumption of a level or rising course, or by landing with an abruptness that tests the strength of every element of the structure.



The Nieuport Monoplane which Represents the Greatest Advancement in Aeronautical Engineering. It Has Captured Important Speed Records and is Notable Because of Manner of Housing Operator and Engine

an electric feed wire, "ascended vertically," and then, at a height of 700 ft., snapped the wire and precipitated itself to earth, killing the operator. About the only truth in the story is the fact that Salida is in Colorado, no one named Walter Archer being known to live there, and no one ever having been killed thereabouts in any type of aviation accident.

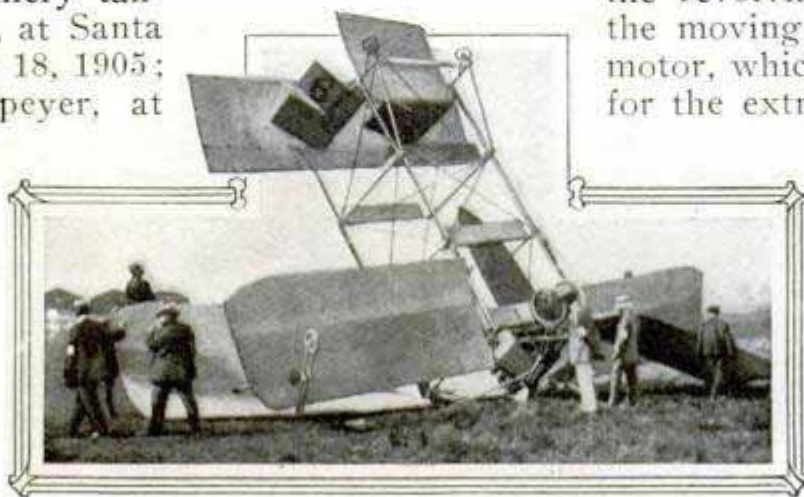
In addition to the 58 fatal accidents with power-propelled aeroplanes, there have been four fatalities with aeroplane gliders, causing the deaths of Otto Lilienthal, with a Lilienthal biplane, at Gross-Lichterfelde, Germany, Aug. 9, 1896; Percy Pilcher, with a Pilcher monoplane, near Rugby, England, Oct. 30, 1899; Daniel Maloney, with a Montgomery tandem monoplane, at Santa Clara, Cal., July 18, 1905; and Eugene Speyer, at San Francisco, Cal., June 17, 1910.

It is a common misconception that safe flight is dependent upon un-
failing op-

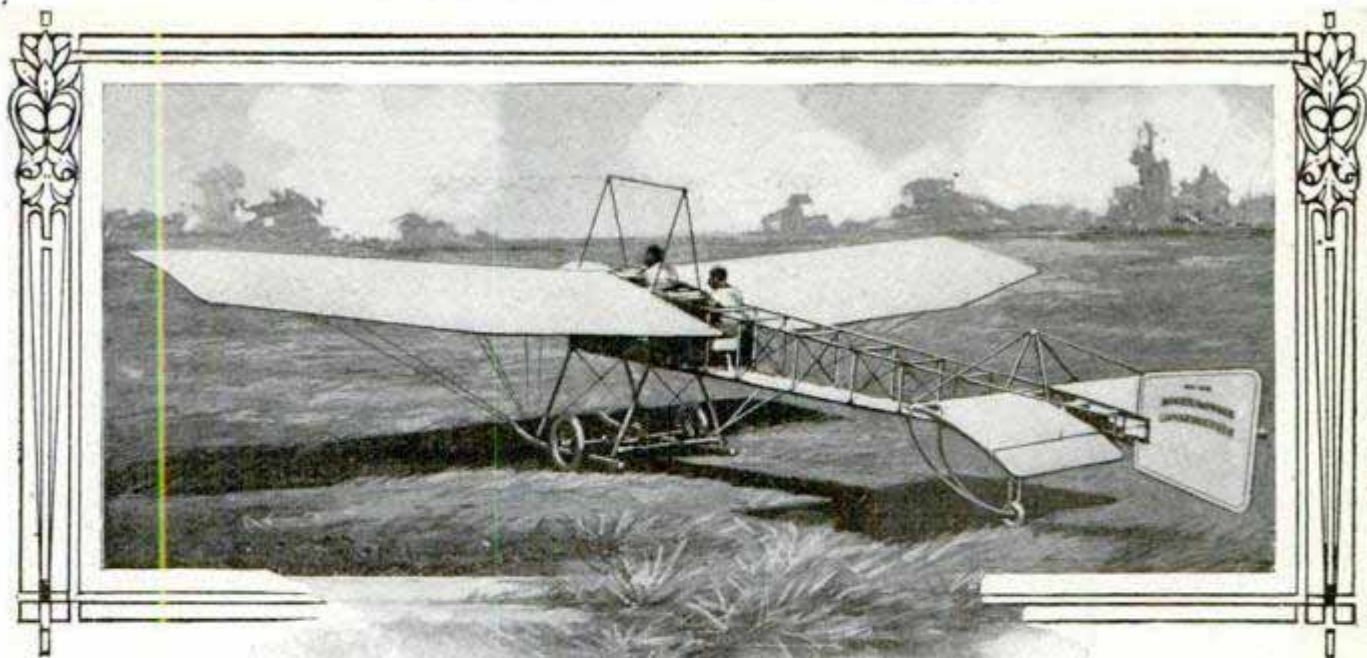
eration of the motor. Were this true, flight certainly would be as dangerous as the worst that its critics think it is.

Successful flight—that is, continued flight—does require that the motor be running to keep the machine at a desired altitude, or to enable it to climb to a higher one, but if the motor stops, the only usual and normal result is that a descent is compelled—not a fall, but exactly the same gliding, controlled, easy descent that is made at the termination of any successful flight. In point of fact, cessation of motor operation rather positively increases rather than decreases safety, in that it relieves the machine of the vibration and the various gyroscopic and reaction effects that are due to the revolving propeller and the moving elements of the motor, which are the reason for the extreme care that is

usual in locking bolts and turnbuckles, and which normally require to be resisted by setting of the rudders and by unsymmetrical



A Breguet Biplane That Stood on Its Head without Hurting the Operator



A New Monoplane Built by Sommer, Showing the Tendency of One of the Foremost Biplane Constructors to Develop in the Direction of a Monoplane Idea, with Motor and Propeller in Front

warping of the wings. It is common practice with many airmen now to stop the motor before commencing a descent, and most altitude records are made by climbing until the fuel is exhausted, then gliding down to earth.

About the only circumstance in which motor failure can result calamitously, aside from compelling a descent upon water, or into cities or other hopelessly encumbered land, is when a landing is attempted in a wind, in proximity to obstacles from which the motor might be required to draw the machine away.

A summarization of the data thus far presented reveals several more contradictions of common opinion. One is the altogether superior safety of the monoplanes—most of which have the motor in front—which are known to be involved in only 18 of the 58 fatal accidents. Of the others, 33 are known to have been due to biplanes, while the best information the writer can secure is to the effect that at least three of the types unnamed were also biplanes. In two of the biplanes and two of the monoplane accidents, two persons were killed. This showing is still more favorable for the monoplane when it is considered that the total flying with monoplanes undoubtedly exceeds that with biplanes. Curiously enough, it

is rather probable that there actually have been more accidents with monoplanes—but they less often result seriously.

Enough has been said, it is hoped, to convince the reader that flight need no more involve fatal termination than does journeying by land or water. And most of all it is hoped to show that, in this newest and most wonderful activity in the history of transportation, commonsense precautions and knowledge of conditions are just as much of a safeguard against danger as in the more prosaic occupations of life.

And as for those who inevitably and in spite of all efforts to prevent, must pay with their lives the toll of human progress, let us not callously regard them as fools who have paid the price of their folly, but as brave soldiers who in sacrificing themselves have contributed their dearest possession, life itself, to the advancement of their fellowmen.

Wrapping blocks of ice in paper as a means of retarding the melting and causing it to melt evenly to the extent it does melt was recommended favorably at the recent joint convention of the Illinois and Iowa Ice Dealers' Association.

TALLEST BOY IN PARADE OF GIANTS

The parade of giants of the Festival of Empire, held at the Crystal Palace, London, as one of the events of the



A Youth Who Stands 7 Ft., $3\frac{3}{4}$ In. in His Stocking Feet. He Was Entered for the Parade of Giants at the Crystal Palace, London

coronation season, brought together many of the tallest men in the British empire. Among them were many youths of abnormal height, the tallest being the one shown in the accompanying illustration. He is only a little more than 20 years old, yet he stands 7 ft. $3\frac{3}{4}$ in. high in his stocking feet. His name is Frederick Kempster, and he was found employed as a basket maker in the Garden City for Boys, Woodford, Essex. His strength is said to be enormous.

MOTORBOAT HULL STRAINS FROM EXCESSIVE SPEED

The strains to which the hulls of motorboats are subjected when the fast little craft are traveling at full speed in choppy waters are truly astonishing, and the wonder is that more accidents do not occur in motorboat racing. Take, for example, the case of the "Maple Leaf III," which in one trial attained a speed of 49.1 knots (56.5 miles an hour).

This works out to 82.9 ft. a second. A body of water moving at this velocity relatively to a flat surface at right angles would exert an equivalent static or dead-weight pressure of about 6,900 lb. per square foot, or, if the angle at which the water and board met were 30 deg. (about what might be expected in the case of a boat in a sea), the pressure would be one-half of this, or 3,450 lb. per square foot, that is, about 24 lb. on every square inch of surface exposed to the shock of the waves.

When to this is added the stress produced by the dead weight the boat has to carry, which is greatly increased in effect by the continuous vibration due to wind, wave and the motion of the engine, the total stress the hull has to withstand is enormous, and it is evident that boat designers will have to exercise as much skill, if not more, in evolving a strong type of hull for racing motorboats, as in producing motive machinery to drive them.

A WEATHERPROOF ELECTRIC INSULATING MATERIAL

What would appear to be the ideal insulating material for electric wires has been reported from Europe and is said to have been subjected to the most severe tests by the telegraph and telephone corps of the Austrian army, with favorable results. This insulating material is composed of a mixture of rusolite (a varnish-like fluid of which a film 1-400 in. in thickness will withstand a tension of 6,000 volts) with a certain elastic and flexible paste. Wires coated with this compound can be wound into coils or twisted into sharp curves without damage to the insulation. Furthermore, the coating is said to be proof against the penetrating action of sand and dust, the effect of any weather conditions, and even against corrosion by marsh waters charged with sulphurous acids which are so deleterious to insulations containing rubber. The application of the compound to the wire is said to be an easy and rapid operation.

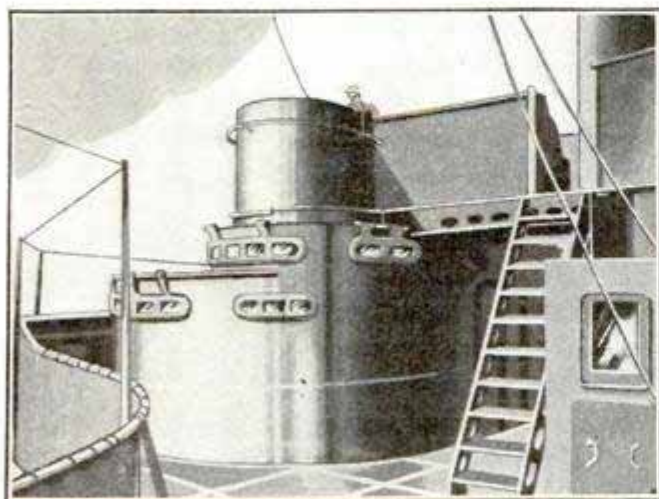
MEASURING THE VELOCITY OF EXPLOSIVES

The time necessary for the complete decomposition into combustion products of an explosive is called "duration of the explosion," and the rapidity of the decomposition "velocity of detonation." The duration and velocity are different for each kind of explosive, and, as the efficiency of the explosive for a certain purpose or under certain conditions is absolutely dependent upon duration and velocity, it is important that they should be measured with the utmost precision.

A German engineer has constructed an electrically operated apparatus by means of which it is claimed that the velocity can be measured to the ten-millionth part of a second.

CONNING TOWER OF NEW FRENCH BATTLESHIP

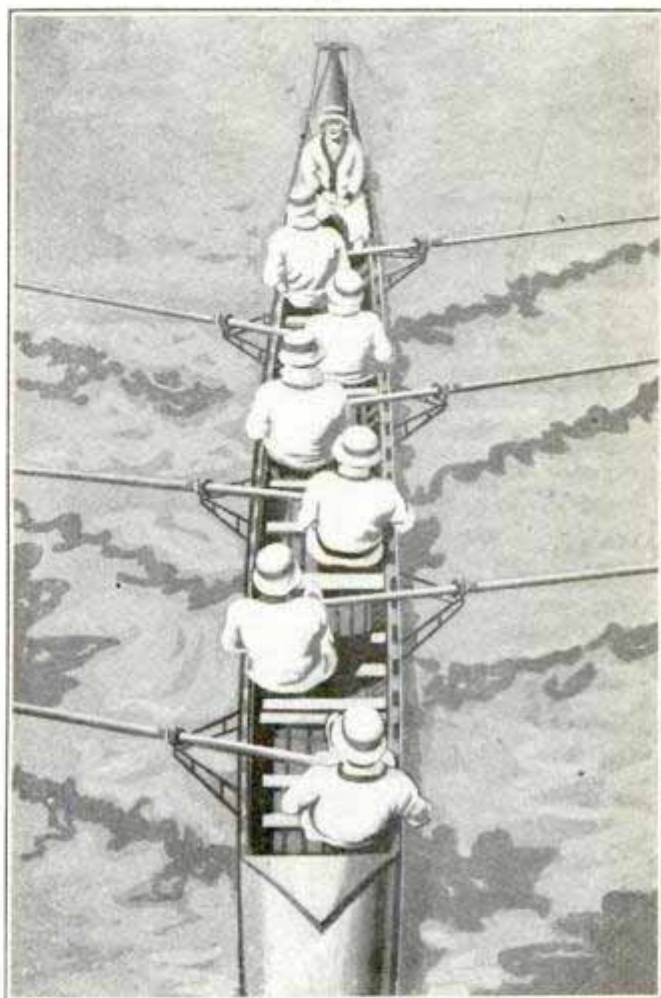
The accompanying illustration shows the conning tower and navigating bridge of one of the French battleships of the Danton class, which corresponds to the dreadnought class of the British and American navies. The long narrow windows of the conning tower are hinged from above and may be swung up out of the way. The armor protection is more extensive than on the British and American battleships, and the shape is somewhat oval so that the projectiles of an enemy will glance off.



The Control Section of the Latest Type of French Battleships

JAPANESE PROFICIENT IN AMERICAN SPORTS

Baseball has become as popular a college sport in Japan as in America, and the teams turned out by some of

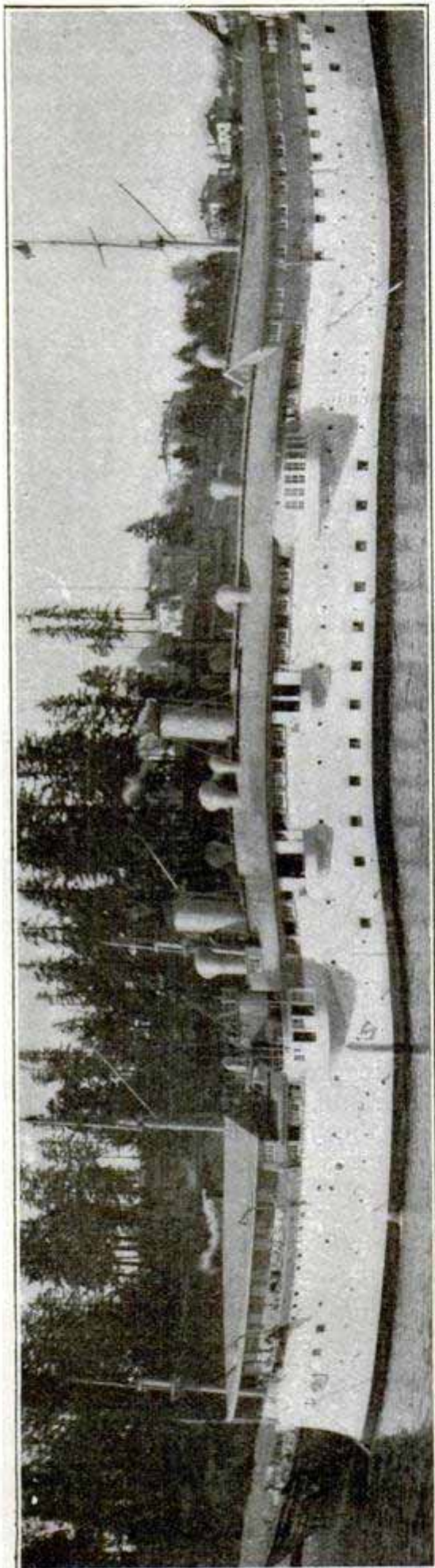


The Crew of Meiji University, Japan, Practicing Rowing in Their New Racing Shell

the Japanese universities compare favorably in prowess with the American college teams, as has been attested this year by the Japanese team in its several victories while touring this country.

But the Japanese universities are not stopping just with baseball, and will probably adopt and become proficient in most of the American and British college sports before they are through. The accompanying illustration shows the crew of the Meiji University practicing in their new racing shell.

CA Chester, Ill., man recently consumed a gallon of ice cream in 18 minutes on a wager.



(Courtesy Fleet Review)

U. S. S. "PHILADELPHIA" ON A SPREE
This freak picture was caused by the running of the negative film due to heat in developing

CHICKENS TRANSPORTED OVER ALASKAN TRAIL

Some 2,000 live chickens were recently started over the long trail from Valdez, Alaska, to the mining camp of Iditarod in a venture that is more or less of a gamble. The chickens were placed in double-decked coops on 16 sleds of the low double-ended type. An airtight floor was arranged in each coop, and special tarpaulins, designed to protect the chickens against the cold yet allow ventilation, were made to cover the loads.

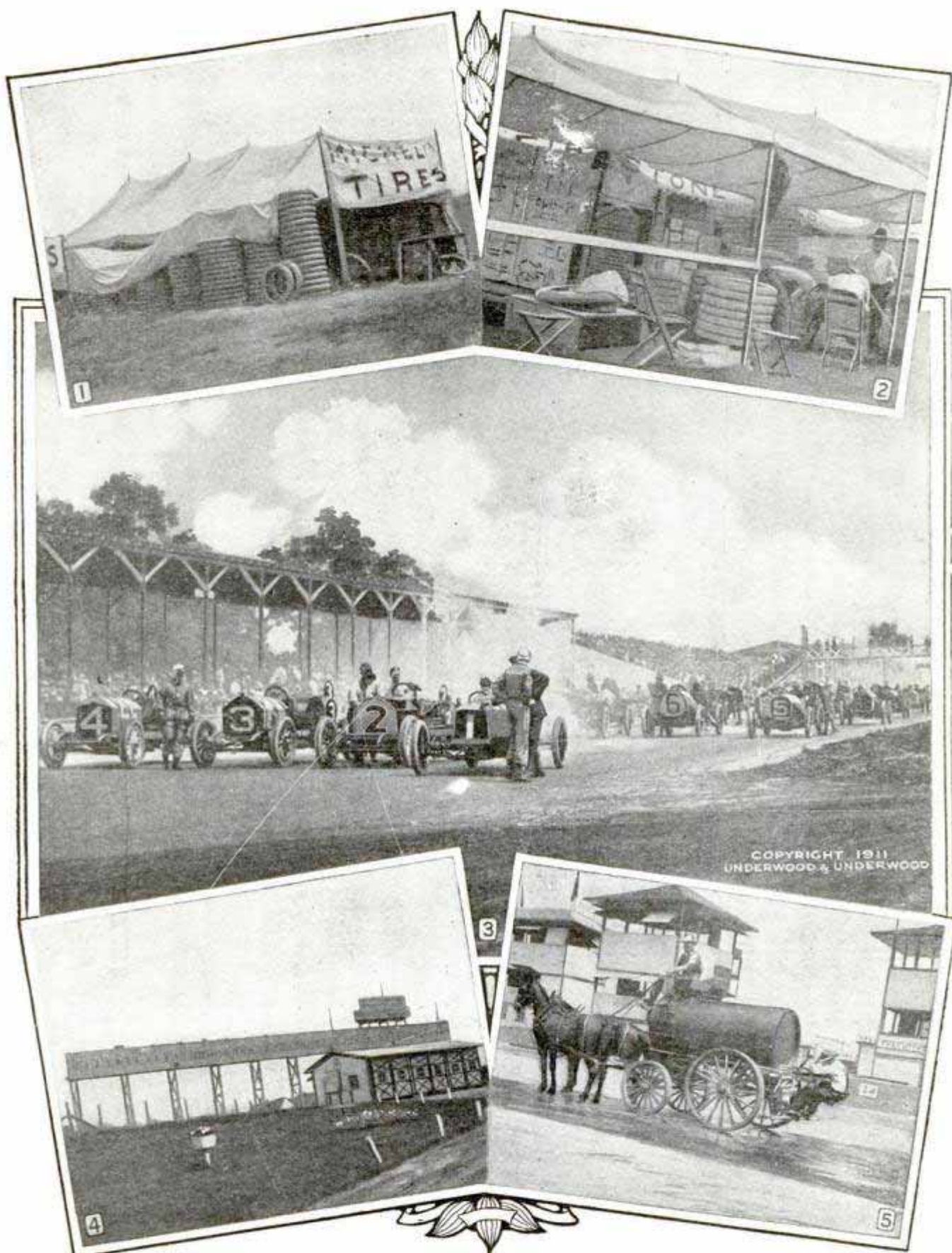
One portion of the long journey was over a 400-mile stretch of snow, through extreme cold. Men were sent ahead of the sleds with feed for the chickens and to erect houses at intervals where the chickens could be allowed to rest and move about. It is said that the project cost several thousand dollars, and that the chickens arriving alive and healthy will bring about \$5 each.

FIREMEN LOSE HAIR AFTER GASOLINE FIRE

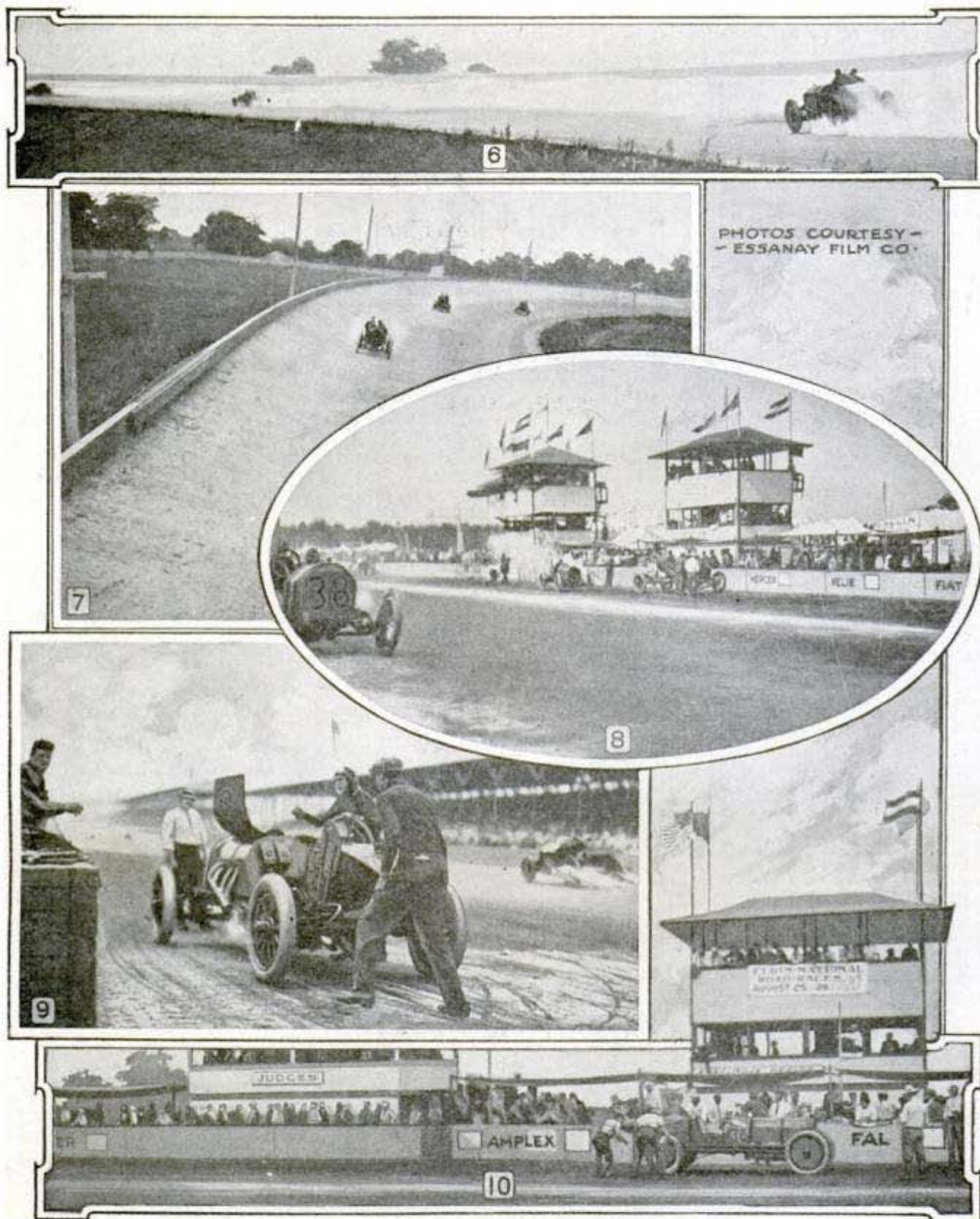
After a long fight to extinguish the flames from a burning gasoline tank near Berlin, four of the firemen, all strong and in good health, suddenly lost all their hair, and despite the efforts of physicians to stimulate regrowth, their hair did not commence to grow again until four months later, and then it was snow white on all four. The only possible explanation was that the fumes from the burning gasoline, perhaps mixed with fumes of some other substance burned, exerted a deadly influence on the roots of the hair.

¶ In the course of a successful motor trip recently made by a party of four from German East Africa into German Southwest Africa, the chauffeur had to be sent home to Germany to obtain new cylinders, this accounting for the long time, 630 days, taken to complete the journey.

GLIMPSES OF A GREAT SPEED CONTEST



- 1 and 2—The tire stations of rival manufacturers at the Indianapolis speedway during recent automobile race. Tires played as important a part as drivers or cars. They decided the race.
- 3—Forty-two cars lined up for the start.
- 4—One of the scoreboards which kept the spectators informed of the relative positions of the cars and their speed.
- 5—Before the race the brick track was carefully groomed. Hundreds of gallons of sal soda was sprinkled to clear away grease which might cause skidding and result in death.



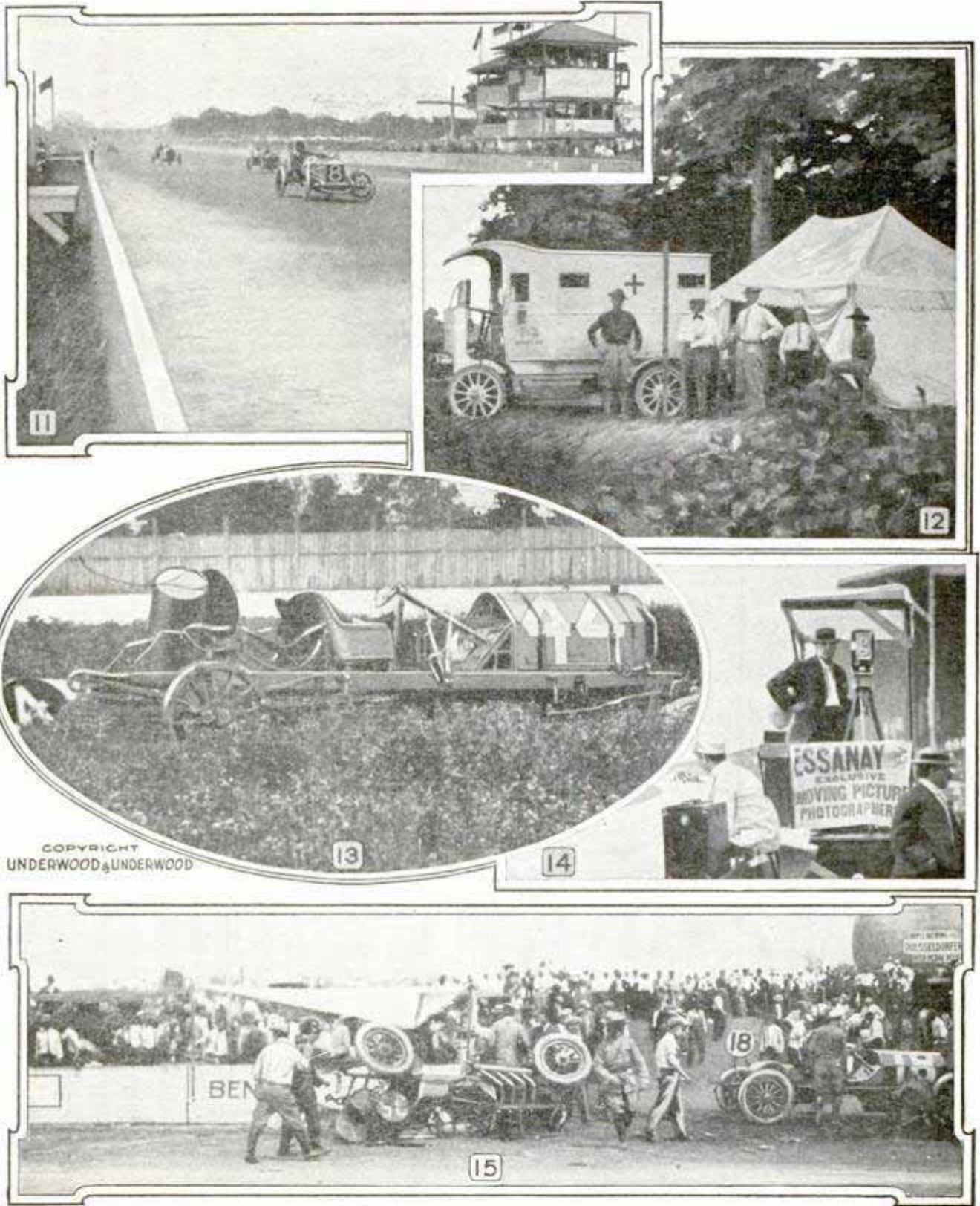
6—Rounding a turn at high speed. Going around at the rate of 75 miles an hour or more, the strain on the tires is terrific and is the most frequent cause of fatalities.

7—One of the turns, with bank rising 15 feet; and concrete wall to prevent cars from plunging over.

8—The pits, where tire changes and repairs are made and the gasoline and oil replenished. Each car has its own pit. In the background are the stands for officials and press.

9—Quick work at the pits—something the matter with the engine and every second precious.

10—Changing a tire. This can be done in less than 20 seconds. The rear right wheel uses up the most tires on account of the turns and the use of the brakes. The illustration shows Harroun's Marmon "Wasp," winner of the recent contest at Indianapolis.



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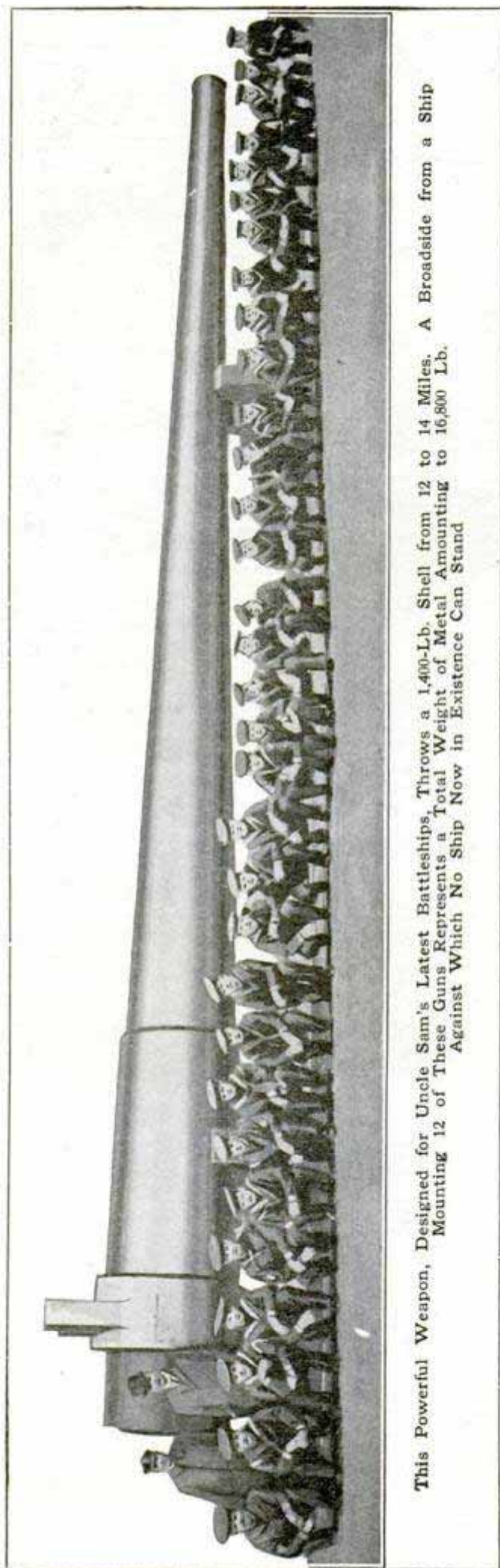
11—A remarkable photograph which shows the spreading of the wheels of the car which caused a smash-up in front of the grandstand, the result of which is seen in the lower illustration (15). The steering device gave away and the pilot was helpless. Traveling at a rate of 80 miles an hour, he was fortunate to escape with his life.

12—Necessary adjuncts at all race meets — ambulance and hospital tent.

13—The mechanic was killed when this car left the track and turned turtle as the driver made a desperate attempt to regain the track.

14—The moving-picture man is in his element in such events.

15—Result of the accident to steering mechanism shown at top of page. Several were injured and it was almost a miracle that no one was killed.



This Powerful Weapon, Designed for Uncle Sam's Latest Battleships, Throws a 1,400-Lb. Shell from 12 to 14 Miles. A Broadside from a Ship Mounting 12 of These Guns Represents a Total Weight of Metal Amounting to 16,800 Lb. Against Which No Ship Now in Existence Can Stand

NEW GUN FOR THE LATEST AMERICAN BATTLESHIPS

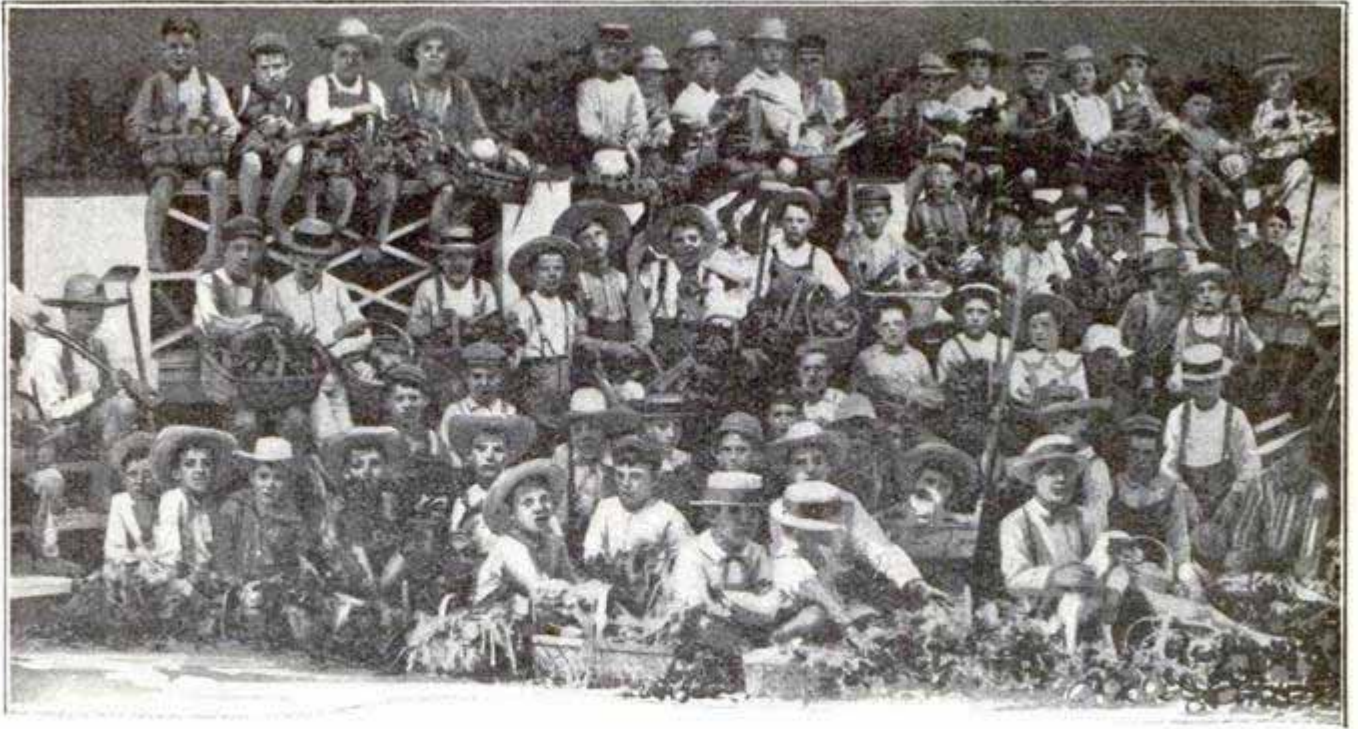
The latest dreadnoughts of the American navy, the "New York" and the "Texas," will have as part of their armament several guns of the type shown in the illustration. This monstrous instrument of warfare is 53 ft. 6 in. long, and weighs 65 tons. It was made at the Washington navy yard. Each gun costs \$74,700 to build, and \$53,000 additional is needed to construct the mount. The shell discharged by the gun weighs 1,400 lb. Including the shell and powder, it costs \$700 to discharge the gun, but it must be remembered that in actual warfare the gun will be fired at an enemy's ship costing millions of dollars. As the shell leaves the muzzle of the gun its initial velocity is 2,600 ft. a second. The shells are effective at a distance of 12 to 14 miles.

KING GEORGE MIGHT CLAIM BRITISH GOLD

According to an old mining statute of England, not enforced for hundreds of years, all the gold mines in the realms over which the English king is sovereign belong to the crown. The statute is a relic of the days when the possession of the sources of gold in any other hands than those of the sovereign would be a continual and threatening source of danger to the king and to the safety of the nation.

This statute, like many others, is practically dead, because no British sovereign would dare assert such a claim, but according to it, King George is said to be legally empowered to lay claim to the \$264,286,000 of gold mined in the British dominions in 1910, and also to the several billions mined during the time the crown has neglected to assert its statutory rights.

Walter Brookins, the young airman of the Wrights' team, has announced his retirement from aviation and will devote himself to farming and mining.



The Boy Gardeners with a Harvest in Front of the Office Building

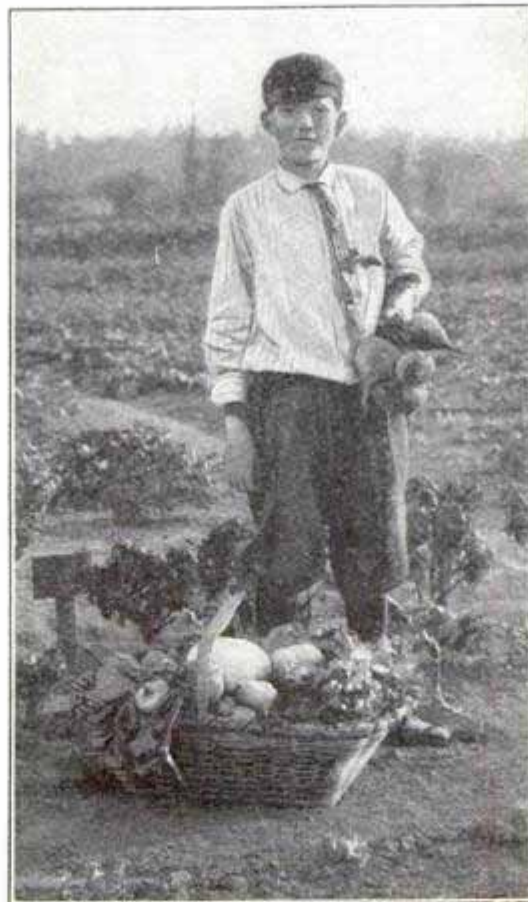
BOYS' GARDEN SCHEME A GREAT SUCCESS

In a part of Dayton, Ohio, overrun a few years ago by boys more than ordinarily rough and mischievous, the standard of boyhood is now far above the average, and all because of a scheme by which each boy was provided with a garden all his own from which he could harvest vegetables to supply his home and for sale to the neighbors.

The "Boys' Garden" is a plot of land advantageously located in a part of Dayton now called South Park, and each boy has a garden 10 ft. wide by 107 ft. long, the whole plot being surrounded by shrubbery. The office of the Boys' Garden Company is a very artistic building loca-

ted at the edge of the gardens, and the officers are boys. The hours of work in the gardens are from 6.30 to 7.30 in the morning, and from 4.00 to 5.15 in the evening. If any boy wishes to work overtime he must stop work when the rest do, report to the head gardener and get permission to continue. Every boy must stay in his own garden, must clean his tools after using, and hang them in their place. The use of bad language is strictly forbidden, and an excuse must be brought to the head gardener in case of absence.

The benefits of the scheme to the boys are remarkable, teaching them to take care of little



The President of the Boys' Garden Company Just Harvesting a Basket of Vegetables from His Garden Strip

things as well as the large ones, benefiting them mentally and physically through work in the open air, teaching them how vegetables grow and how to keep the ground working all the time, and supplying them with pocket money honestly earned.

There are 30 prizes for good garden work, ranging from \$15 to \$1. Prizes of \$4, \$3, and \$2 are also given to the three boys whose account books are best kept. The harvest of each garden belongs to the boy who works it, and many of them make as much as \$15 for the sale of vegetables, besides providing vegetables for their own homes.

The story of the garden scheme as written by Wilbur Geiger, the 12-year-old president of the Boys' Garden Company, is as follows:

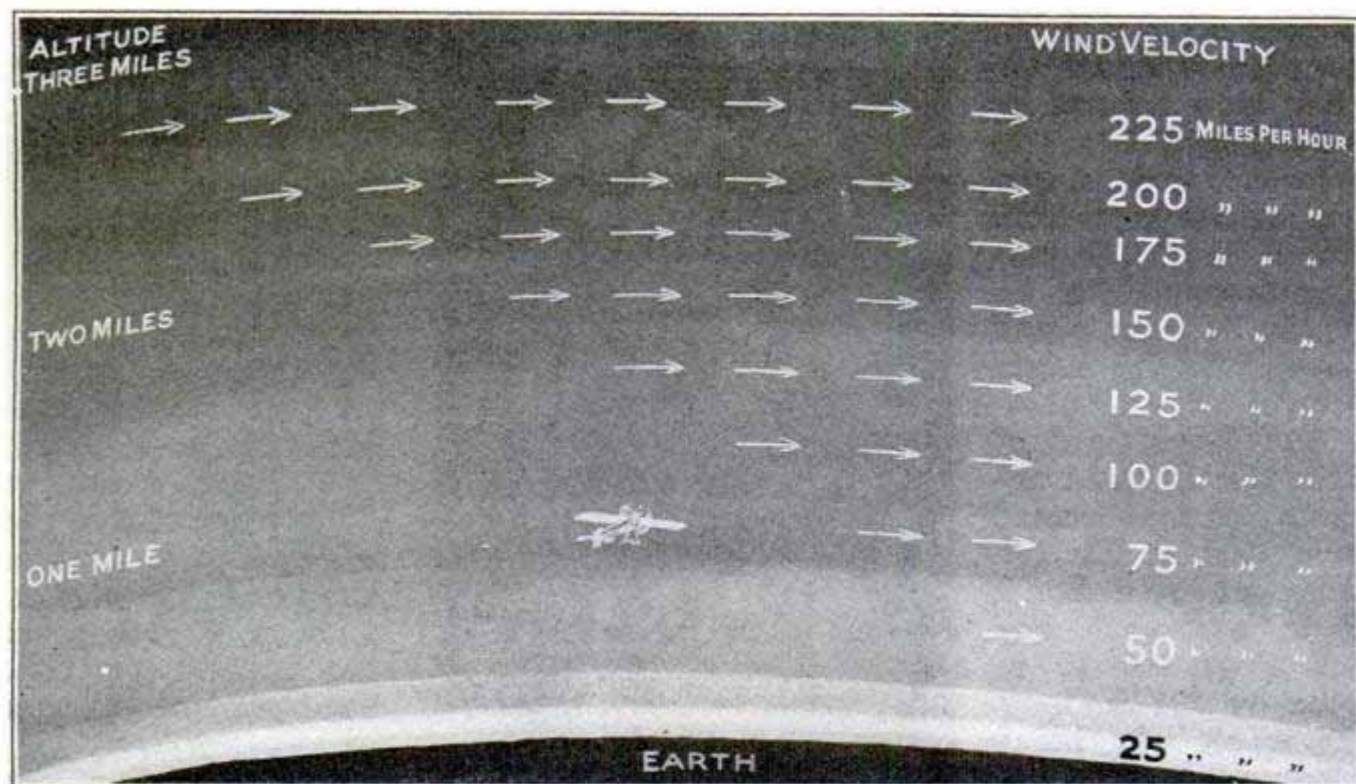
"We raise all kinds of vegetables on a piece of ground known as the Boys' Gardens. They were started a few years ago in the south part of Dayton, Ohio. It was known as 'Slidertown.' People said that all bad things slid down there. They had the graveyard, the pest house, and a lot of bad boys.

These boys threw stones and broke windows. They ran across yards, tore up flowers, and broke down fences. They smoked, called people names, and swore. It was so bad that nobody wanted to live there. People did not want to build houses there.

"The people tried to find out how to stop this. They thought they would give the boys something to do. If they were at work they would not be doing these other things.

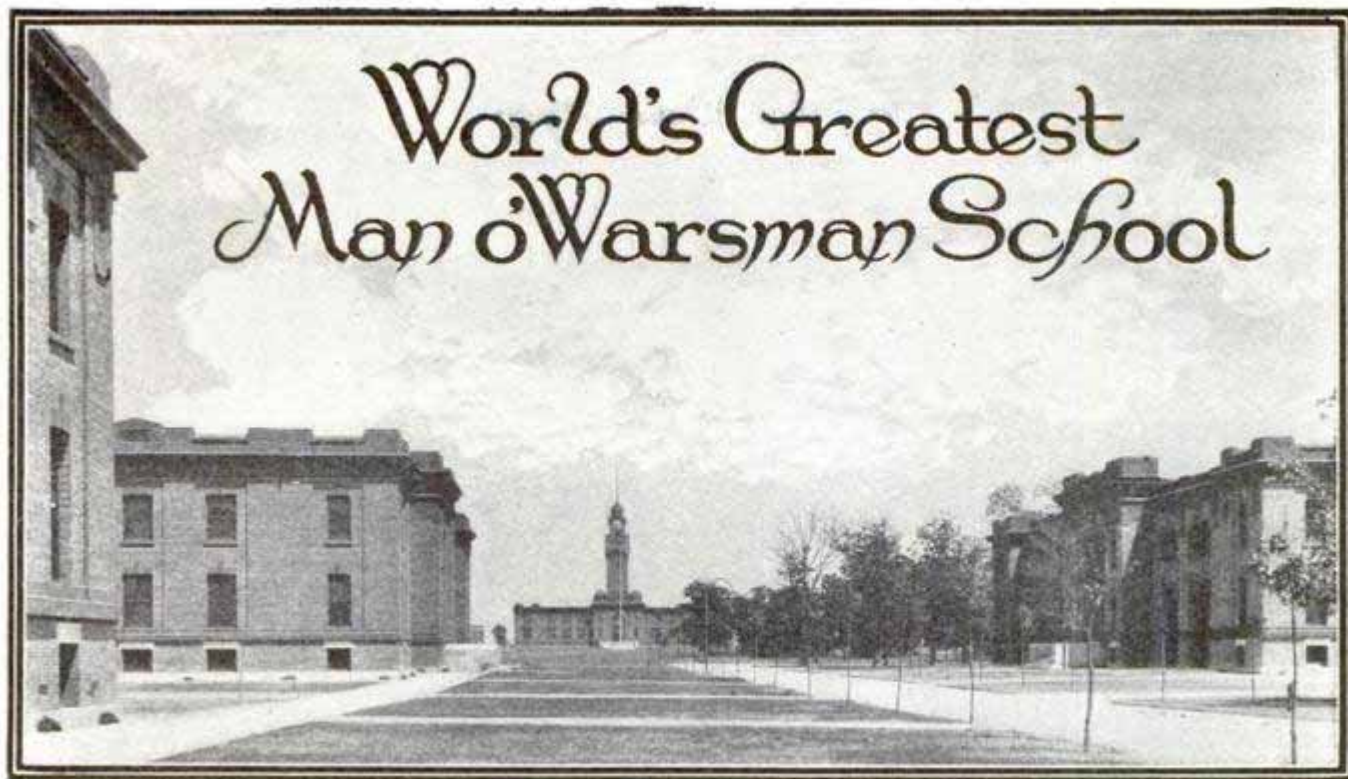
"So the ground was plowed and the boys put to work. At first they did not like it. They laughed about it. But when the sprouts came they were glad. Then the plants grew up. Later on the vegetables came. The boys liked it now and they told others about it.

"Somebody offered prizes for the best gardens. This made the boys work harder. They tried to win the prizes. At first nearly everything raised was used in our homes. Later we began to sell some of it. The neighborhood is now called 'South Park' instead of 'Slidertown.' People like to live there now."



Aeronautic and engineer experts have been discussing at length the unauthenticated report that Jules Vedrines, the French airman, made a flight at the rate of 155 miles per hour in a Morane monoplane from Dijon to Saint-Laurent-les-Macon. The flight was made in a strong wind. That such a speed is possible is admitted, tests having proven that winds sometimes attain a velocity of 225 miles an hour at a height of three miles, while at the ground, the wind is but 25 miles an hour. The illustration shows how an aeroplane ascending from one stratum to another can take advantage of these winds.

World's Greatest Man o'Warman School



Main Plateau; Dormitories in the Foreground; Administration Building in the Distance

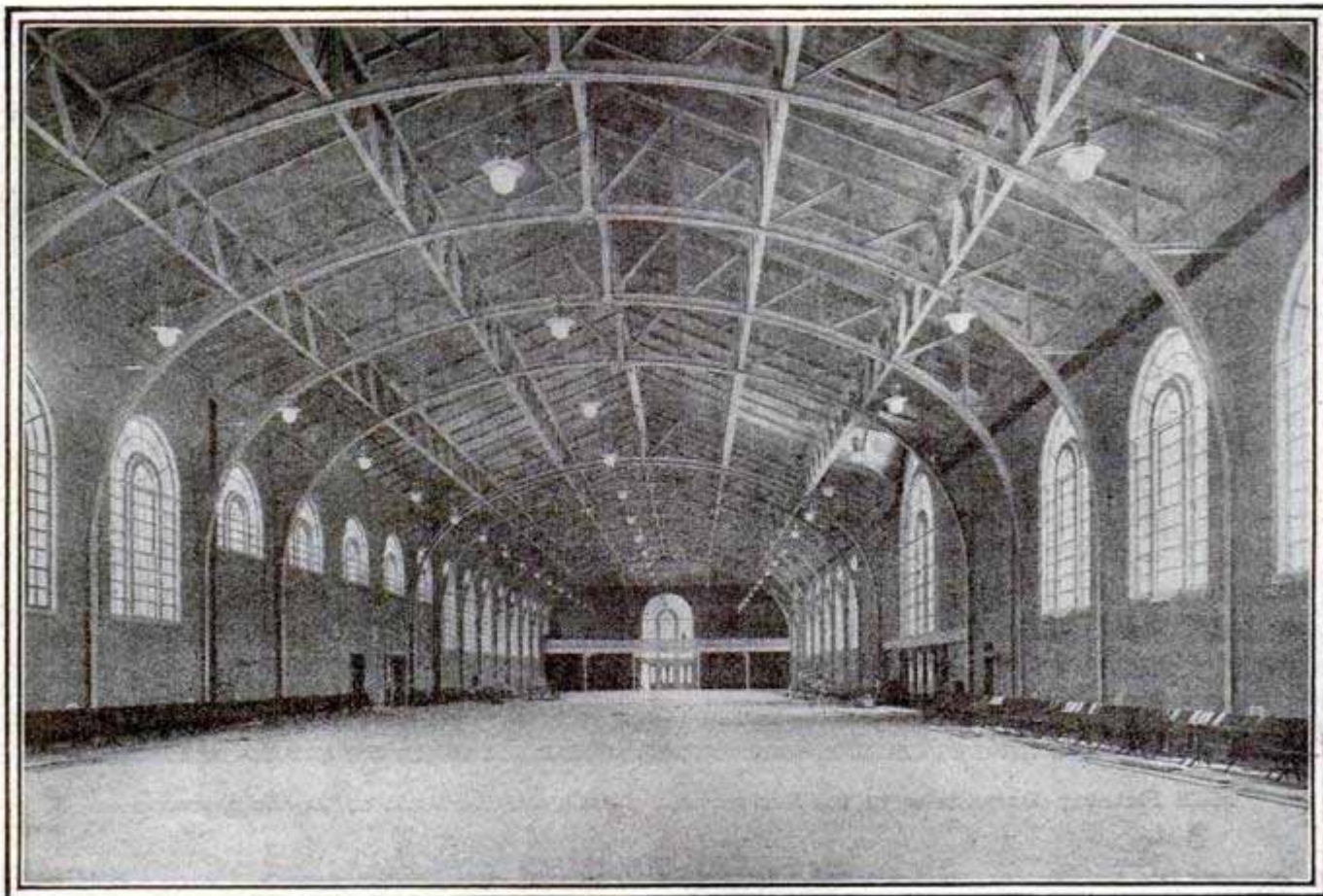
By FRANK MAYNARD

THE new training station or school of the United States Navy, located about 28 miles north of Chicago on the west shore of Lake Michigan, 1,000 miles distant from the nearest seaboard, was opened July 1, but the formal dedication ceremonies will not take place until some time this fall.

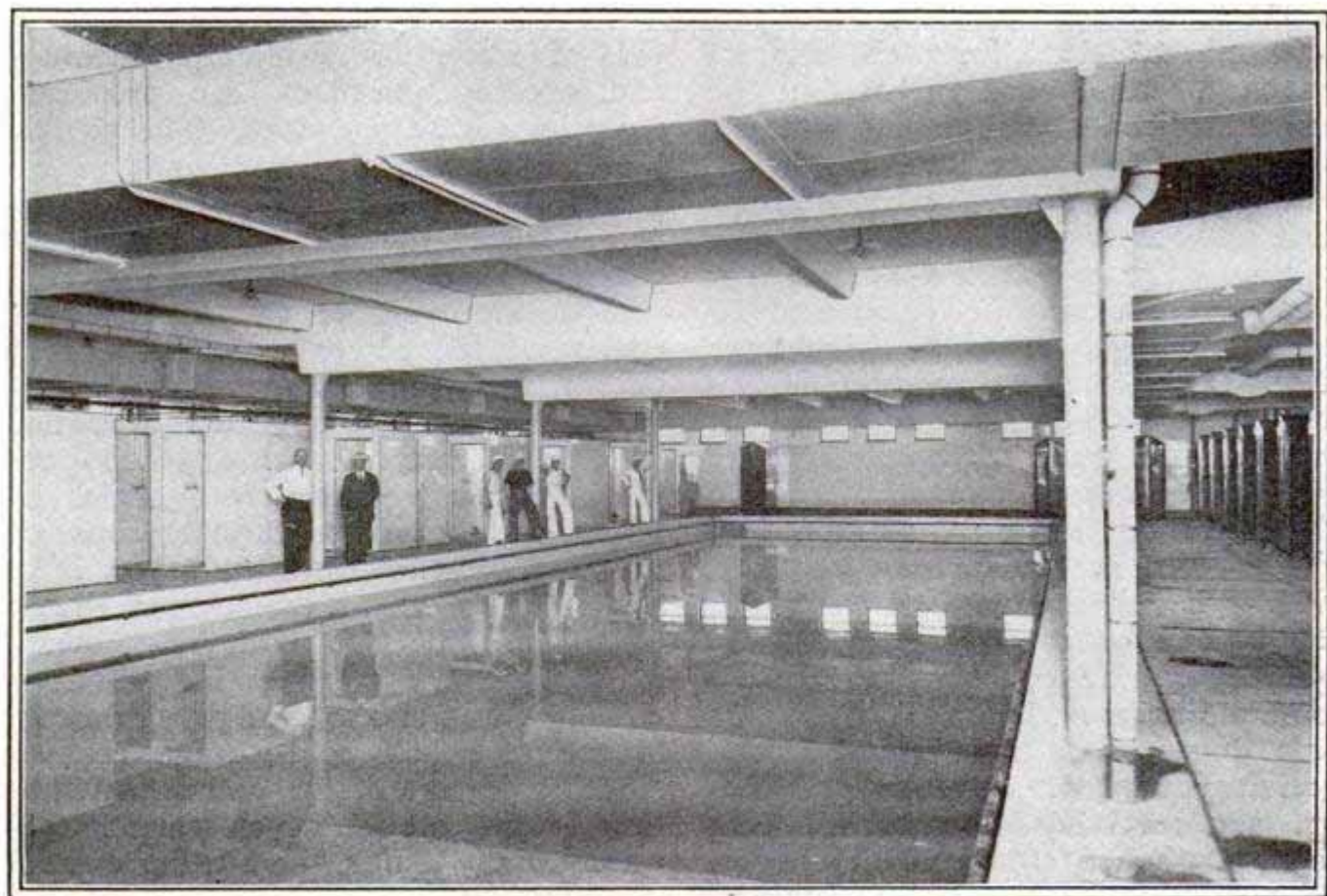
Considered the finest and most complete school in the world for the training of young man-o'-war-men, it comprises 182 acres of land and 39 brick buildings, some of which are huge. The construction cost is approximately \$3,500,000, and the work has taken six years to complete. The 39 buildings include, among others, an administration building, a drill hall with an interior 400 ft. long by 90 ft. wide, a hospital which cost \$230,000 and is one of the most completely equipped in the country, an instruction building, mess hall and galley, four main dormitories, main guard house, receiving guard house, receiving building, six receiving dormitories, brig (jail), boathouse, commandant's house, 13 houses for officers and their families, and a great power house.

The sanitary and power features of

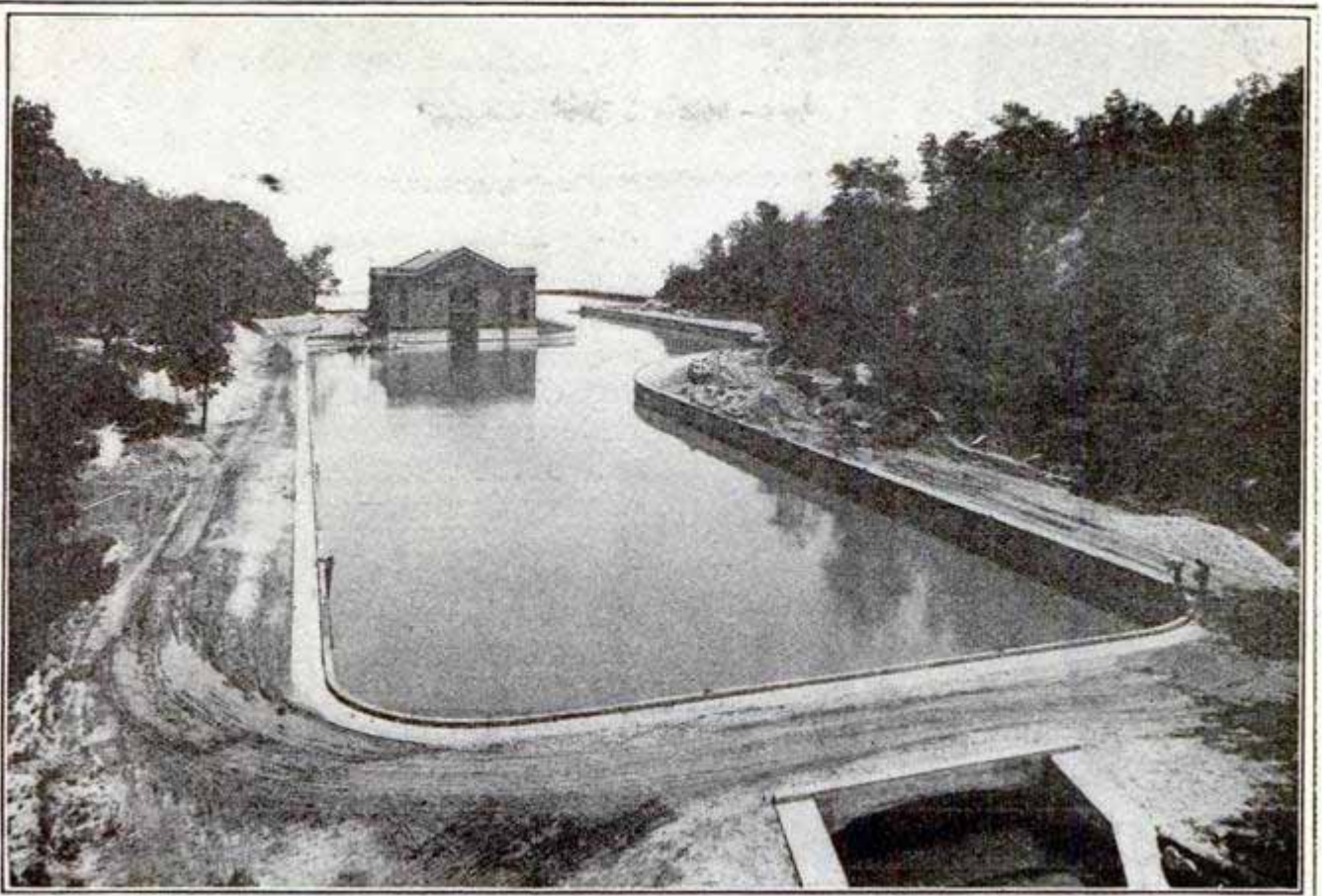
the station are most complete and interesting. All sewage is taken care of by a disposal plant which will handle 200,000 gal. per day, and 200,000 gal. of water for drinking, washing and cooking purposes, are provided daily by a filtration plant. The power plant, which furnishes heat, light, water and power to the various buildings, is located at the foot of the bluff on the lake shore, with its roof just rising to the level of the bluff. The coal used for power purposes is run onto a trestle over the power house, and is dropped through the bottoms of the coal cars into chutes leading to the mechanical stokers, from which it passes into the furnaces and drops in the form of ashes from the grates into ash receivers, all by the force of gravity. In connection with the power plant there is a refrigerating and ice-making plant, and a brine pipe running to the mess-hall cold-storage rooms. Another feature of the power installation is the tunnel which carries the water-supply mains, the heating mains, the electrical transmission lines, etc. Manholes at different points on the ground give access to this tunnel,



Interior View of the Drill Hall, Which is 400 Ft. Long by 90 Ft. Wide; 1,000 Men can be Easily Swung in This Great Hall, Which will be Used at Times for Dances and Roller Skating



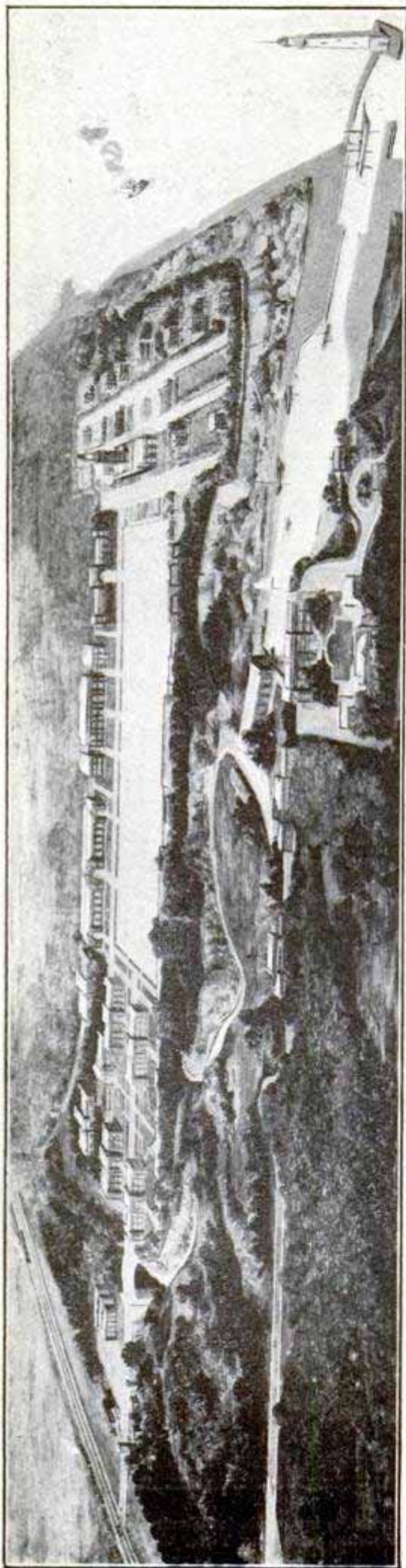
This Swimming Tank is 90 Ft. Long by 30 Ft. Wide. Along One Side are Marble-Walled Shower Baths and Tub Rooms. It is in This Tank That the Apprentice Man-o'-Warsmen will be Given First Lessons in Swimming and Handling Themselves in the Water



The Inner Harbor and Boat House. The Depth of Water is about 8 Ft., Which is More Than Sufficient for the Small Boats Used in the Training of the Boys



Each Dormitory Has a Huge Shower Bath into Which 250 Boys March in a Body Each Morning and Receive a Wholesale Washing, after First Stripping in Adjoining Rooms, Washing Their Clothing in Tubs Provided for Each, and Then Placing the Clothing in the Dryer

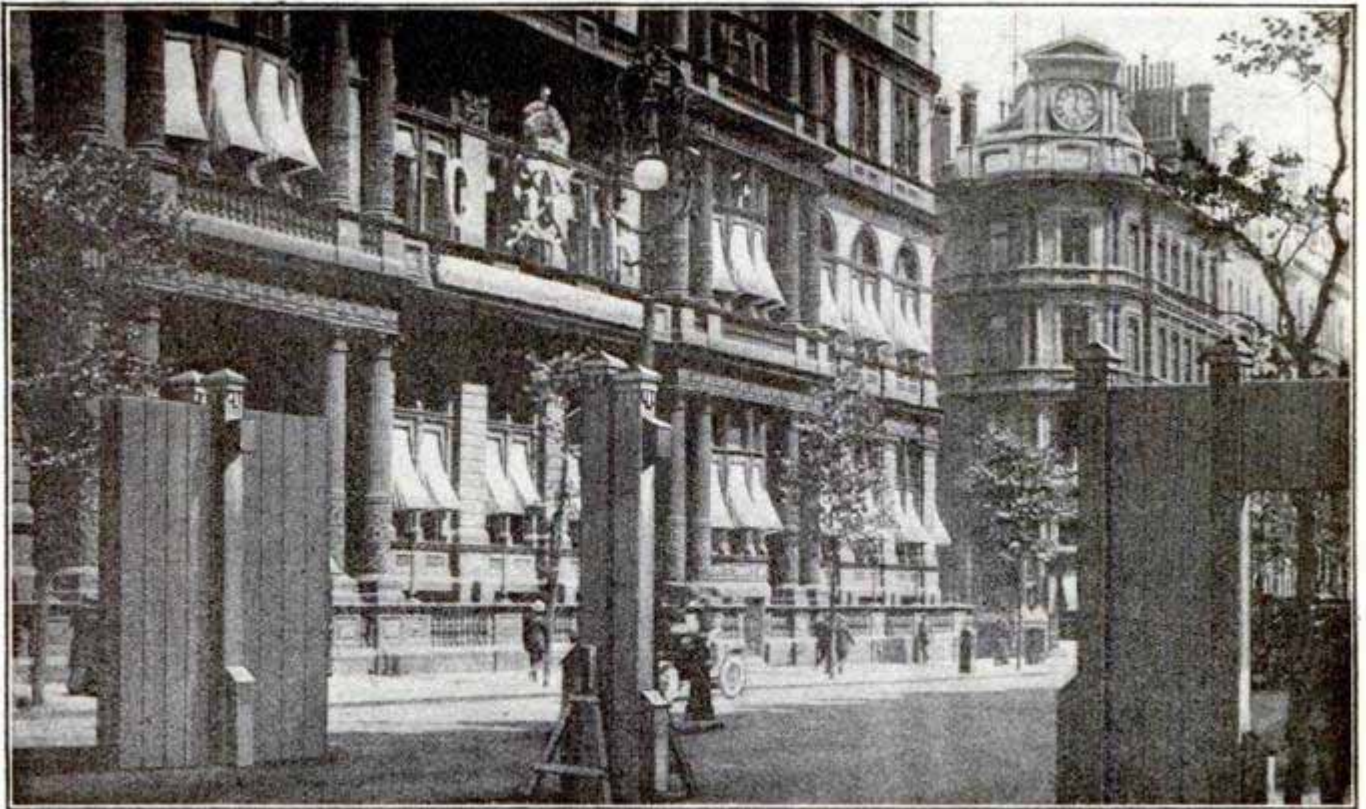


Bird's-Eye View of the Complete Plant. The Buildings at the Extreme Left are Those of the Receiving Section. Just at the Left of the Parade Ground are the Dormitories and Mess Hall; the Drill Hall, Class Building, and Store Building Fringe the Side, and the Administration Building Faces the Parade. The Officers' Houses are in a Row Facing the Lake, and the Hospital is in the Foreground

through which inspectors may pass to examine and repair the different pipe and cable lines.

The arrangement of the different units of the station is ideal, the three main units occupying separate plateaus, divided by deep and beautifully wooded ravines. The first plateau, which is farthest from the lake and skirted by the railroad lines, contains the receiving division of the station, and is a little station within itself. It comprises the receiving building, six receiving dormitories, each of which has its own mess room, a galley, and laundry. The recruits, sent from the different recruiting offices in the section of the country vaguely defined as the "middle west," enter the station through the receiving building, where they are at once stripped of all clothing, bathed, given a hair cut, a shave if necessary, and a medical inspection. If they pass the inspection they are given a complete outfit of man-o'-warsman clothing and assigned to one of the receiving dormitories. While this is going on the civilian's clothing worn by them on arrival is being fumigated and cleaned. Should the recruit not pass the medical examination he is passed into a rest room, where he awaits the return of his civilian's clothes. These he dons, and then passes out into the world again, plus a bath, shave, haircut, and a wholesome meal. The successful recruits remain on the receiving plateau, segregated from the remainder of the station for a period of three weeks, after which, if they are perfectly healthy and no sign of disease develops, they pass to the main plateau, where the training commences in preparation for actual duties on a warship. The total stay at the naval school is only five months, after which the young man-o'-warsman receives a rating and is assigned to duty on a warship.

The capacity of the "Great Lakes" school is 1,500 without crowding. Each of the four main dormitory buildings has four large sleeping halls, and will accommodate 400 men, who sleep in hammocks, as on board ship.



One of the Wooden Gates Erected to Control the Coronation Crowds

LONDON'S CORONATION GATES

Wooden ramparts, provided with heavy wooden gates, were erected in London with the object of fencing in the entire route of the coronation procession, this radical action being considered necessary to insure the safety of the masses of spectators. Seventy such barriers were erected, and were closed by the police at any point when the number of people along the route of the parade became as great as could be handled with safety.

ARMY AND NAVY BIG GUNS TRAINED ON AIRCRAFT

For the first time in the history of the world, and more particularly since aeroplanes and dirigible balloons have been recognized by military experts as practicable machines of warfare, exhaustive tests as to their efficacy and adaptability in actual battle will be made during maneuvers by the United States navy now in progress at Hampton Roads and in and around the Virginia capes. While the naval experiments are being conducted at sea, the

War Department is working on the same problem at the testing grounds at Sandy Hook, outside New York Harbor.

Only heavy artillery is being used in the tests—guns of great penetration and range. The three-inch weapons, discharging a shell of nearly 150 lb. in weight, were on the program for the beginning of the tests.

The aeroplanes are represented by mammoth kites in which dummies have been placed. The dirigibles are represented by big gas bags manipulated by seamen in small vessels.

CANDY DIET PROVIDED FOR LONDON POLICE

The squads of London police detailed to help guard the course of the coronation parade were provided with sticks of chocolate, and bags of acid drops as a part of their food ration. This diet, treated by many of the police as a delightful joke, was recommended by the chief of the police surgeons as the best for an arduous day's work in warm weather.

SCIENCE FAILS TO FATHOM



"The secret of the destruction of the 'Maine' will never be known. . . . The destruction was such . . . the deterioration so great . . . it will be impossible to tell whether the primary explosion was within or without. . . . The greatest force, however, was from the inside, indicating that the forward magazine had exploded. Whether this was from a sympathetic explosion caused by a torpedo from the outside may forever remain a mystery."

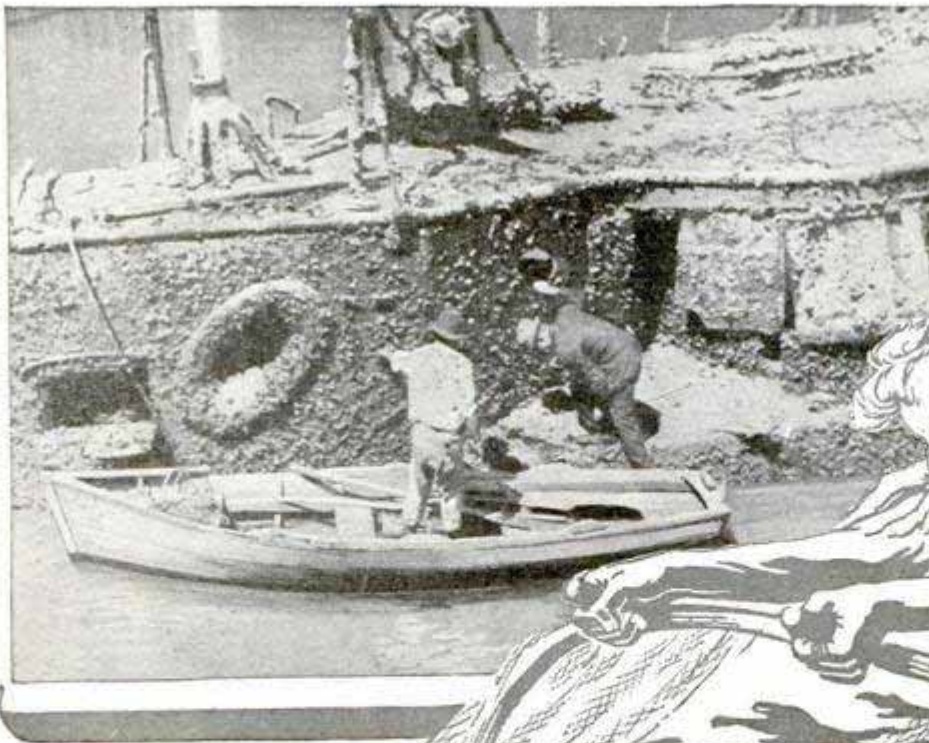
General W. H. Bixby, Chief of Engineers U. S. A. in his official report, July 6, 1911.

THE MYSTERY OF THE MAINE



"That the shattering of the hull, expressed by mute testimony of . . . decks upheaved, was far greater than supposed, was revealed this afternoon."

News dispatch, Havana, Cuba, June 15, 1911



"An officer's sword was discovered behind the forward, port side door. On the main deck were the bones of two arms and the remnants of a foot. On the spar deck was a small ammunition box and a number of bayonets reduced to masses of rust. Parts of a dinner service were found as they had been left by the stewards after the last dinner."

News dispatch, Havana, Cuba, June 19, 1911.



BUST OF "SUNNY JIM" WEARING GLASSES

The bust of Vice-President Sherman which will shortly be received in Washington will show "Sunny Jim,"



The Vice-President's Eyeglasses Chiseled in Marble

as he is familiarly called, wearing glasses. It will be the first time in the history of the government that such a statue or bust shall have been put on public view. Sculptor James Earl Frasier, of New York, tried to show the glasses that have become so familiarly associated with Colonel Roosevelt when he made the bust of our only living ex-president for the vice-presidential hall of fame in the Senate wing of the Capitol building in Washington, but he was not successful. A woman sculptor, Mrs. Bessie C. Vonnah, also of New York, was successful in making a likeness of Vice-President Sherman wearing his glasses, and, as Mr. Sherman is greatly pleased with the result, it is probable that the bust will be accepted by the National Legislature and that Vice-President Sherman will go down to posterity wearing his "specs."

Recently invented machinery is responsible for the possibility of the sculptor being able to depict a subject wearing glasses.

MIRROR MAKES PATRONS FACE FRONT OF CAR

Street car companies in at least two cities of the United States are making a subtle appeal to the vanity of their women patrons to lessen the number of accidents charged against their concerns. The posting of a sign requesting its passengers to face the front of the car when alighting has not had the desired effect on women and the railroad men have resorted to psychology by placing a mirror on the rear platform attached to the body of the car in such a way that to see "if their hats are on straight" the passengers must face the front. The device has not been in operation long enough for the results to show in the statistics of accidents, but the railroad men declare that more passengers are alighting "facing the front of the car," than ever before, the temptation to look into the mirror being too strong to resist. And if the "look" is taken,



Courtesy Chicago Daily News

Mirror on a Chicago Street Car, the Subtle Influence of which Makes Passengers "Face the Front of the Car When Alighting"

the passengers are in such a position that it would be a positive inconvenience to leave the car any other way than by facing the front.

FIRST AEROPLANE FLIGHT OVER NIAGARA FALLS

The "gap of death" of the three-ringed circus seems as tame as a Sunday-school picnic in comparison with the hair-raising feat performed by Lincoln Beachey in his biplane on June 27 last, when he braved the air holes and eddies over the seething falls of Niagara, and after literally swishing through the spray of the Horseshoe Falls, swooped down 1,200 ft. and passed under the arches of the upper steel bridge, down the gorge almost to the whirlpool, and finally rose again to the Canadian side, where he made a successful landing. Beachey twice circled above the cataract at a height of 2,000 ft. before he made his sensational dive, which caused 150,000 spectators to hold their breath as the aeroplane rocked and tipped in terrifying fashion.

"It was the most exciting trip of my life," said Beachey after he had landed, and considering the fact that the opening under the bridge is only 168 ft. high and barely 100 ft. in width, and that he cleared the water by not more than 30 ft., most people will take his word for it.

THE "SPECTACLED" BEAR OF THE NEW YORK ZOO

A fine specimen of the bear species known as the "spectacled" bear, and probably the first of its kind that has ever been exhibited in North America, is now an inmate of the New York Zoological Garden.

On at least three or four occasions a "spectacled" bear has been exhibited in the zoological gardens of Europe for brief periods, but it is said that during the last 15 years only one was seen by American zoologists traveling in Europe, and that was in the Am-



First "Spectacled" Bear Ever Exhibited in North America

sterdam zoo, in 1903. During the past 11 years the efforts of the New York Zoological Society to procure such a bear have been persistent and continuous. After years of waiting, and many disappointments, Edgar Beecher Bronson, a well known author, finally procured the coveted animal, which arrived at the New York zoo a few months ago.

Regarding the life history of the "spectacled" bear (*Ursus Ornatus*), very little is known, except that it inhabits the Andes of Ecuador and Peru. It is a jet black bear of rather slender build, with a long, rangy body, very long feet, small ears, and the strange white markings on face and throat from which the species takes its name.

CURING RHEUMATISM BY BEE STINGS

The busy honey bee is achieving a new usefulness in an interesting experiment being performed in Cincinnati. It has been discovered that the sting of the industrious little bee is a sure cure for rheumatism. One sting will not cure rheumatism, neither will two or three, but if a sufferer from this malady will let a bee sting him at inter-

vals for several days, he will eventually be cured. Just one bee sting each day will soon inoculate the system with the poison which acts as a counteracting



Curing Rheumatism with Stinging Honey Bees.
Applying Bee to Arm

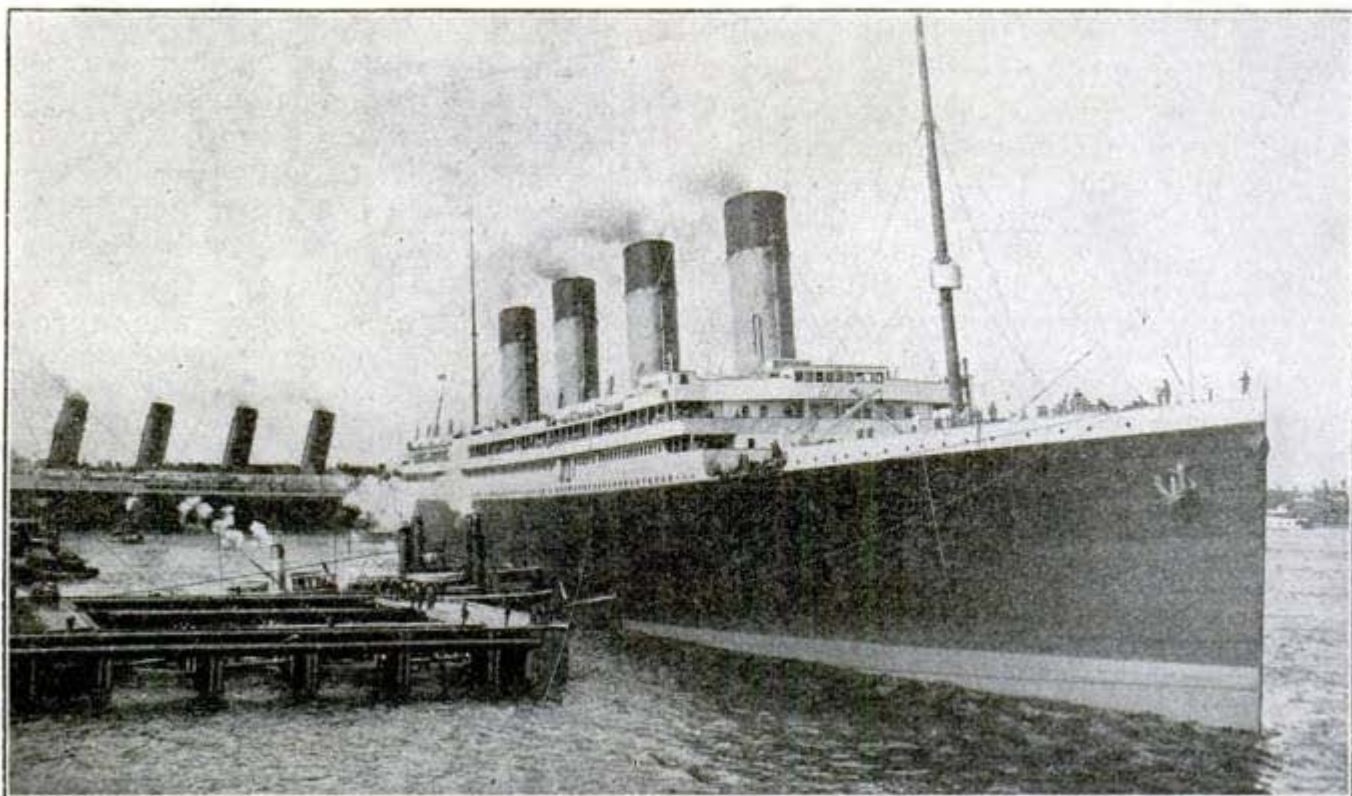
agent in nullifying the rheumatic pains. At least that is what say the physicians who are watching the novel treatment with much interest.

The patient undergoing the bee-sting cure as shown in the illustration visits

the apiary twice each week and at each visit allows the honey bees to sting him from three to five times right over the spot where the rheumatism is painful. Sharp and acute as the sting of the honey bee is for the moment, this sufferer declares it is a pain of relief compared to the dull incessant pain of rheumatism. He has been under treatment for two weeks and has taken in all just 17 stings during this time. He says he likes it better than taking bottles of medicine.

"OLYMPIC" OVERSHADOWS "LUSITANIA"

This photograph of the "Olympic," taken as she ended her maiden voyage and was being docked at New York, June 21, is of special interest because it shows the "Lusitania," which, with the "Mauretania," she succeeds as the biggest ship in the world, in the background backing slowly out of her slip as though slinking away. Although the two giant Cunarders lose the title of "biggest," they still retain supremacy over all ocean liners in speed, and will probably continue to hold it for some years to come.



The Proud "Olympic" and the Jealous "Lusitania"



The "Tolliver" Airship being Completed by a California Inventor — the Covering Partially Removed to Show Position of Four Engine Rooms, the Cabin, and the Intercommunicating Passageway

NEW DIRIGIBLE HAS MANY NOVEL FEATURES

An airship which embodies a number of new ideas in airship construction is now being built in San Diego, Cal. It will be of the rigid type and is designed primarily for passenger transportation. Even its general appearance will be very different from other airships as it will have all its cabins and machinery, except the propellers, within the gas bag.

The ship will be 250 ft. long and 40 ft. in height. It is designed for a crew of four and a capacity of 40 passengers. There will be four engines generating 128 hp., and six propellers. The gas bag will have a capacity of 228,000 cu. ft.

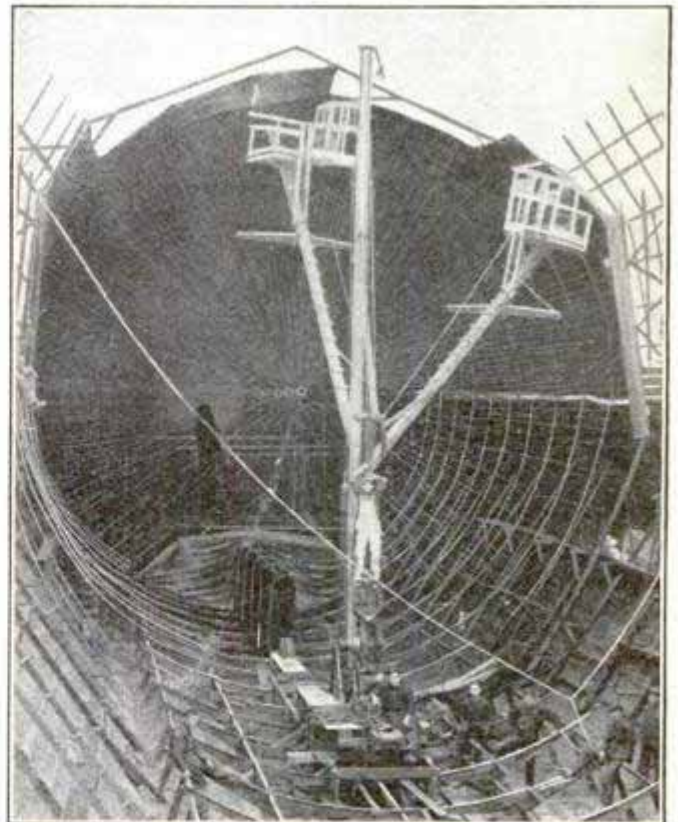
The methods of construction give the ship sufficient strength while at the same time they make it considerably lighter than any airship of its size ever before constructed. A keel of bamboo poles laced to a spruce running board extends the entire length of the ship. The keel has a crushing strength of 20,000 lb. Sections of aluminum, 6 ft. square, form the framework. These sections are first covered with silk and then riveted together so as to make a perfectly tight joint. The corner of each section is braced to the center hub of the ship with the best quality of steel piano wire. On the lower part of the airship the silk hangs loosely and is kept from flapping by a net which holds it tight. This provides room for the gas to expand in high temperatures or altitudes.

The ship will have four engine rooms and one passenger cabin. One engine room or conning tower is located in each end of the ship at the

extreme end of the cone, and there is a companion-way between them which runs the entire length of the ship and uses the bamboo keel as a floor. The two other engine rooms will be located near the base of the cone in each end of the ship, the passenger cabin being located in the center.

The four engines each weigh 172 lb. and generate 32 hp. They are of a special rotary type and are practically vibrationless. They have been tested for months and found to work perfectly under all conditions. Each of the engines in the end of the ship is located but 21 in. from the propellers.

The arrangement of the propellers



View of Interior of Dirigible During Construction Showing Aluminum Frame and Passageway Connecting Engine Rooms

and the method by which they are controlled are special features of this airship. The end propellers are mounted on flexible shafts and are connected by ball-and-socket joints. It is therefore possible for them to be turned to pull straight ahead or at any desired angle. Thus it is not necessary for the airship to depend upon rudders for steering,

done equally well while the propellers are standing still or turning at full speed.

The covering of the airship is composed of 5,800 sq. yd. of the finest pongee silk and is metallized by a special process so as to increase its gas-holding properties. It is first treated in big cement vats with a solution that preserves the silk. It is then covered with 11 coats of different materials, the last being of aluminum. After the final coat is applied, the silk is practically impervious to gas and under test has held gas for nine months.

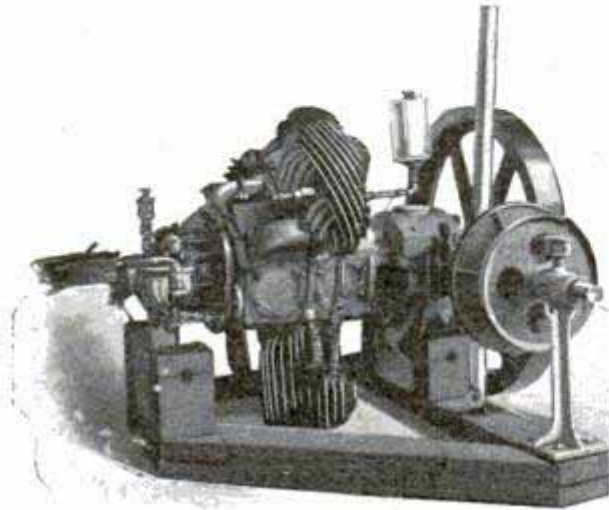
The passenger cabin, engine rooms and companion-way are all separated from the gas by double-thickness silk and the sides of the passenger cabin are protected by woven aluminum wire walls. The floors are made of bamboo laced together. The passenger cabin can be entered by doors on either side, and celluloid windows will give an abundance of light.

A crew of four men will be required to operate the ship, with one man for each engine. The man in the front conning tower will be the pilot. There will be windows on all sides of the front tower so the pilot can see clearly in all directions. He will be in constant communication with the other engineers by means of a telephone system and signals and will be able at all times to direct the movements of the ship.

PRODUCING "WHITE" LIGHT FROM A SINGLE SOURCE

Colors, as recognized by the eye, have different values according to the various kinds of light in which they are viewed. For ordinary purposes, colors are graduated according to their appearance in average daylight, which, although it is variable with the time of the day, the weather conditions, and even with the slight changes of the light from the sun itself, is yet sufficiently constant to use as a standard.

It is well known that artificial illuminants, with the exception of the

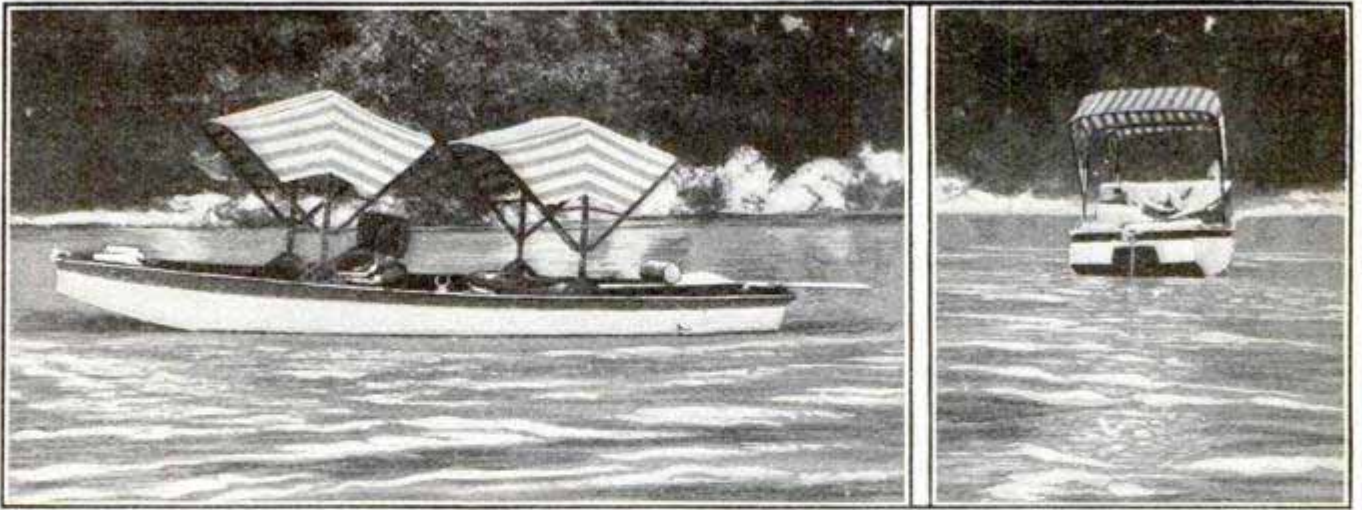


One of the Rotary Engines of the Airship being Constructed at San Diego, Cal.

and so be always more or less at the mercy of wind currents. Its course can always be altered by changing the angle at which the propellers are pulling and it can even turn in its own length if necessary.

The side propellers are also mounted on flexible shafts and can be made to pull straight up or down, or forward, or at any angle between these directions. These side propellers, it is claimed, will make it possible for the airship to be almost entirely independent of ballast during flight. They will make it possible for the ship to ascend, or descend to its landing place in a vertical line, or to rise suddenly to higher altitudes in order to avoid storms and wind currents. When the propellers are all pulling directly forward it is expected they will give the airship a speed of 60 miles an hour.

The propellers can all be reversed in a quarter of a second while they are going at full speed. This is accomplished by reversing the plane of the blades while the propellers continue to revolve in the same direction. Experiments have proved that this can be



A Motorboat with a Tunnel Stern and an Old Wagon-Spring Propeller Guard

carbon-dioxide tube lamp developed by Moore, and some other special light sources, make no pretense of imitating daylight, although various combinations of them have been proposed and used to some extent, in which one lamp supplies the deficiencies of another so that the total effect is a light in which colors have approximately the same value as in daylight.

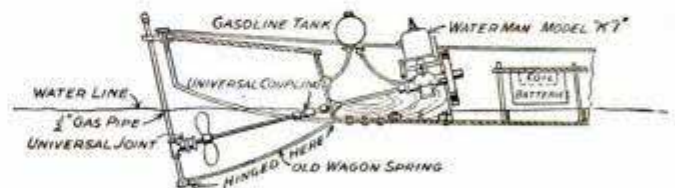
Recently, an alternative method has been proposed, which, although it has the disadvantage of being inefficient and therefore somewhat costly, has the merit of simplicity and positiveness which renders it of the greatest value to color artists and others who wish to continue their labors into the evening. It is a so-called "subtractive" method, in which certain parts of the light from a single source are stopped by a suitable screen of colored glass, the light coming through the screen being then practically the same as "white" daylight. The preferred light source is the tungsten-filament electric incandescent lamp. This is inclosed in a box having a colored glass window which cuts off just enough of the red and yellow components of the light to leave a "white" light which is indistinguishable from daylight.

ⒸA lightship intended for the port of Hamburg will be furnished with an oil-engine-driven electric generating plant to supply electric instead of oil light to the lantern.

WAGON SPRING GIVES MOTOR-BOAT SHALLOW DRAFT

An old wagon spring and a tunnel stern give this motorboat a draft of anywhere from 18 in. to 6 in., according to the depth of the water in which it is traveling. The boat, which is 16 ft. long, and driven by a 2-hp. engine, was constructed for a mountain stream, very shallow in many places, and having small rapids where the water runs at a speed of 7 or 8 miles an hour.

The features of the power installation are the universal coupling, which makes the propeller shaft flexible, and the old wagon spring, which accomplishes the same service for the propeller guard. Under ordinary conditions, the propeller is 18 in. below the surface, at which depth the propeller does its best work per revolution. Should the boat come upon a shallow spot, the guard raises the shaft and propeller automatically, the spring sliding along over the bottom or obstruction, thus allowing the boat to

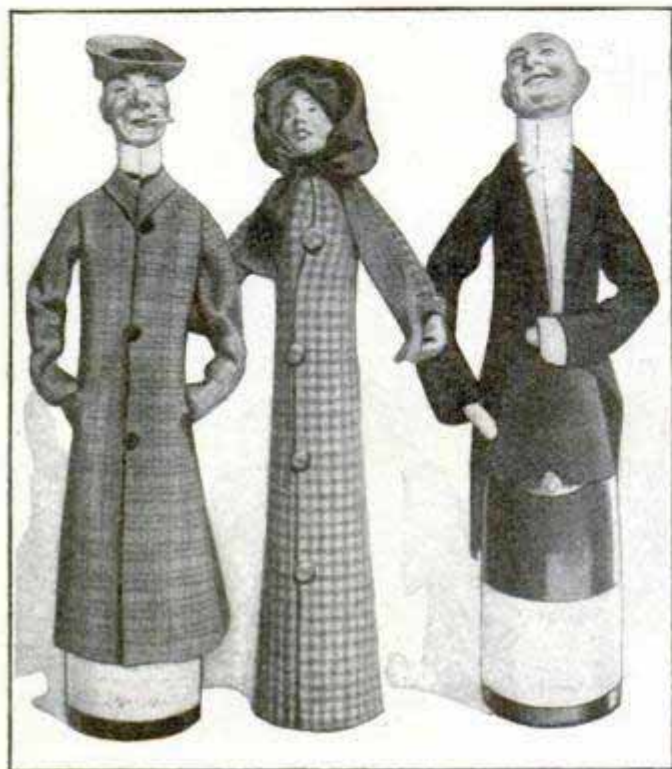


Showing the Arrangement of the Old Wagon Spring and the Universal Coupling

navigate in 6 in. of water. When the propeller is raised, the engine speeds up with the decreased resistance, so that the loss of power in shallow water is not appreciable.

FANCY-DRESS COSTUMES FOR WINE BOTTLES

These fancy-dress costumes for wine bottles are the creation of a Vienna artist, who believes the fancy-dress



Wine Bottles in Fancy-Dress Costumes

idea should extend to table decoration, especially in connection with fancy-dress balls. The idea affords a wide field for ingenuity in the costuming art. The single figure, for instance, is called "the after-dinner speaker."

SMOKELESS POWER PLANT FOR RAILROAD TRAINS

A suggestion for a smokeless, traveling power plant for railroad trains, to comprise a Diesel oil engine direct-connected to an electric generator, a storage battery equal to the maximum power requirements, motor-driven running gear, and a controlling apparatus for switching in the dynamo and battery separately or together as required, was put forth by Robert H. Kuss during a discussion of the smoke problem in cities at a recent meeting of engineers in Chicago. Experts are divided in their opinion as to the practicability of such a combination.

ELECTRIC VALVE OPERATED AT A DISTANCE

In a recent type of electrically operated valve for hydraulic and pneumatic systems, the valve is unseated by the hammer blow of an iron plunger which is sucked up suddenly into a coil of wire when the electric current is turned on at any convenient place situated some distance away from the valve. The valve is then held open by the difference between two unequal pressures. The amount of electric current required is small, and the coil circuit may be closed from any location by a simple switch of the snap or knife-blade variety. One of the many uses of this system is the remote control of the valves used for setting the brakes of a pneumatic brake-control system. In signal systems it may be employed to advantage to save piping and permit the control of air-operated whistles or the like from a central station.

WHEELED-CAR TOBOGGAN NEW EUROPEAN FAD

A four-wheeled light car, without motive power, is being much used in Europe for racing down long winding descents. It gives very much the same kind of sport in summer that the toboggan provides in winter, and the speed is sometimes terrific, the drivers having all kinds of opportunities to display skill and daring.

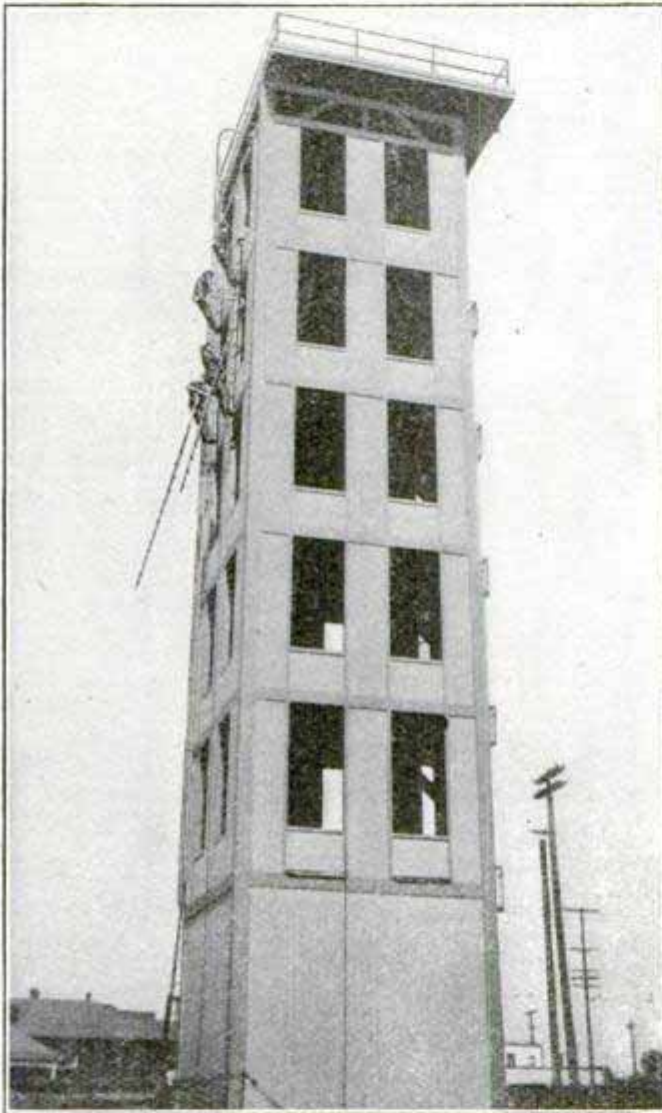


Used for Racing Down Long Winding Descents in Europe

A PRACTICE TOWER FOR FIRE-FIGHTERS

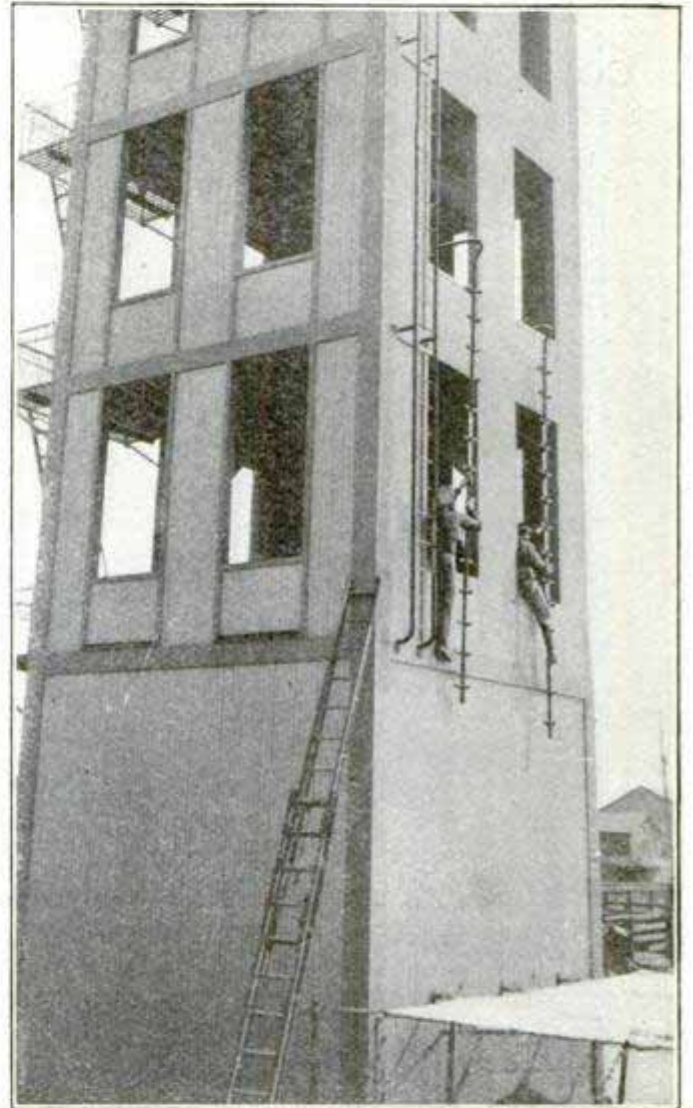
A 76-ft. drill tower for firemen has been erected by the city of Los Angeles, following the lead of other progressive municipalities, and classes of "smoke-eaters" are practicing feats of agility on it every day. In this way they will know just how to handle the scaling ladders, life nets, life-line guns

those members of the force who do not show sufficient strength or agility to render effective service. The practice with the scaling ladder is one of the most important and the men are taught to mount from floor to floor with military precision of movement. It is essential when a crew is working to-



The Los Angeles Practice Tower for Firemen. Crew of Four Ascending with Scaling Ladders

and other modern devices, instead of having to take their lesson during actual conflagrations. The tower has the height of a 7-story office building, but is only about 12 ft. square. It is built of wood and provided with window openings, standard fire escapes, standpipes, etc., and provides an opportunity for the inexperienced firemen to learn their business, besides enabling their superiors to weed out



Crew Descending with Two Ladders. This View Shows Fire Escape on Side of Tower, and Net at Bottom

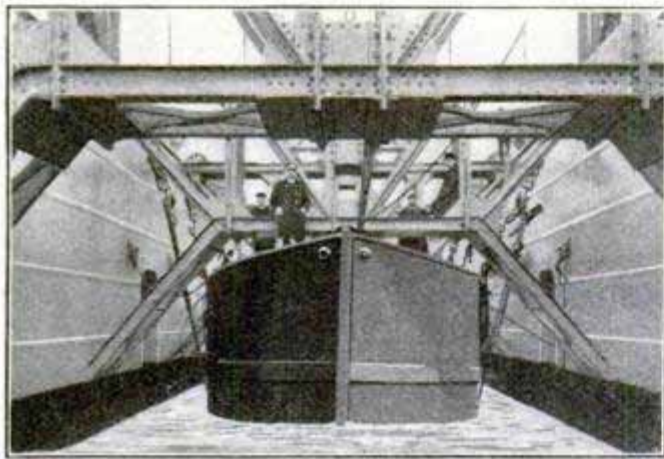
gether for each man to do his part "just so," and when four are sent up together with the ladders, a fire captain directs their movements with a whistle, and insists upon absolute accuracy of each movement. If a man use the left hand when he should use the right, or vice versa, he is given a "calling down" until he does it right. The firemen are required to slide down the rope from the top of the building,

and this is done with the assistance of a life belt and big snaphook. A half hitch is taken through the steel hook and the learner practically runs backward down the side of the tower and

drops into the life net. Dummies, or leather bags of sand, are provided to give the men practice in carrying human beings from upper windows, both by the ladders and life lines.

RAISING SUNKEN VESSELS BY SALVAGE DOCK

A salvage dock, consisting of two L-shaped pontoons connected by open-work girders, has been constructed by a German shipbuilding company to lift sunken vessels up to 800 tons in weight and up to a length of 200 ft. The length of the dock is 150 ft. and the clearance between pontoons is 27 ft.



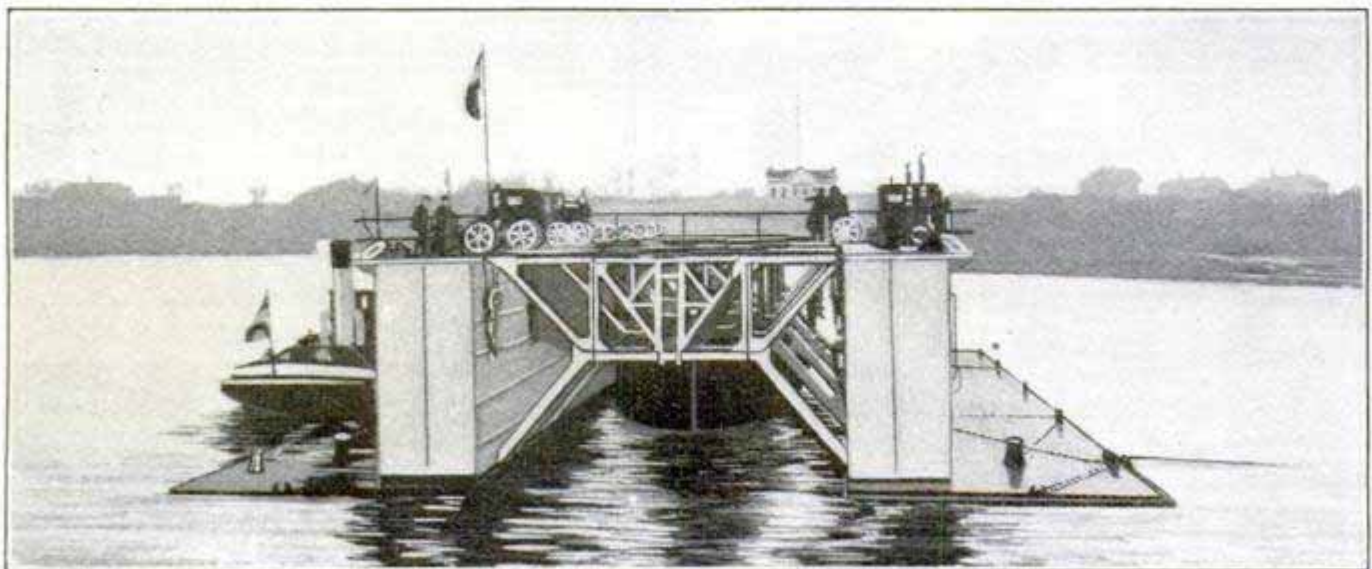
A Raised Lighter between the Pontoons of the Salvage Dock

When engaged in lifting a sunken vessel, the dock is anchored in position above it, the lifting cables are made fast to the vessel in any con-

venient way, the dock is then sunk to its full extent, and the lifting ropes made taut. There is an ingenious arrangement of compensating cables running in pulleys, by means of which the tensions on all the lifting cables are equalized. The extent of one lift is about 26 ft., and takes about three hours of pumping. The depth from which a vessel can be lifted is not limited to one lift, as the sinking and pumping out of the dock can be repeated again and again, with the proper adjustment of cables being made each time, until the vessel is drawn up into the space between the pontoons.

The designers of the dock say that the system could be applied to the raising of vessels of 10,000 tons or more in size.

¶The passenger department of a western railroad has inaugurated a plan which allows the passengers to order dining-car meals and make selections from the menu at the time they purchase their tickets.



German Salvage Dock Engaged in Raising a Lighter

COMMENT AND REVIEW

Inter- national Municipal Congress

EXPERTS of international fame, and officials from all the large cities in the world will gather in Chicago in September, to attend the International Municipal Congress. The purpose of the congress is to exchange ideas with a view to each visitor finding some feature of benefit not at present known or employed in his own city. For example, Berlin leads the world in street improvement and modern architecture; London in the handling of traffic; while in Paris the names of great men in the history of France and other countries are posted on the city lamp posts, not as names of streets but in order that the children may become familiar with their lives and deeds. Washington and Lincoln are two of the Americans thus honored.

One has but to contemplate the billions of dollars invested in streets, sewers, city water and lighting plants, parks, playgrounds, school buildings, city administration buildings, fire and police departments, and scores of other municipal properties to realize the enormous scope of the congress.

The program comprises 16 general subjects with 59 subdivisions, any one of which alone might profitably employ the convention for an entire week. In addition there will be a great display of exhibits classified under 140 heads of appliances and materials used in the building and operating of cities, towns and villages. The congress will last two weeks, all its deliberations will be open to the public; and will unquestionably result in saving millions of dollars by reason of more permanent improvements. Towns of 1500 population up cannot make a better investment than sending a city official to study in this great international school.



Great Water Works

AN hour's travel, or less, from any of the largest cities in this country will bring one to some spot so wild and untamed as to seem to be a part of primeval forest or wilderness. When a nation begins to recover deserts and drain vast swamps, both of which in its earlier days were considered as never to be of any value, we begin to realize the progress which has been made in civilization and development. While in the far West millions are being spent in bringing water to arid acres, replacing cactus with cantalope and rattlers with raspberries, in our far East the process of recovery is being reversed. The Great Dismal Swamp of Virginia, of slavery-day tradition; and the Everglades of Florida, written into all the early history of Indian warfare, are each being drained.

Thus millions of acres of land, some with more water, other with less, are becoming available with a productiveness and fertility unsurpassed anywhere. These great engineering works, by Government and individuals will create a vast territory capable of supporting half the present population of this country. That the day is here when such reclamations are profitable, is suggestive of the time when, like the nations of the Old World, we will need every acre capable of cultivation.

IN these summer days when electric fans and cooling drinks are at their best, Captain Amundsen and his intrepid party of Norwegians are at this moment fighting their way toward the South Pole. There the darkness of the long Antarctic night is now at its blackest; the thermometer registers 100 degrees below zero; and the winter blizzards unequaled for fury anywhere else on our globe, are raging. To attain his purpose he must not only explore a land unknown, but under conditions of difficulty the most severe ever undertaken, not the least of which is the 130 miles of crevassed glaciers. Lofty ice-covered mountains, which rise for thousands of feet almost like a wall, must be climbed only to find abysses on the other side equally deep, to be crossed. The enterprise calls for heroism and perseverance not known to any adventure among Knights of old, and its success will write the name of Amundsen high on the history of all time.

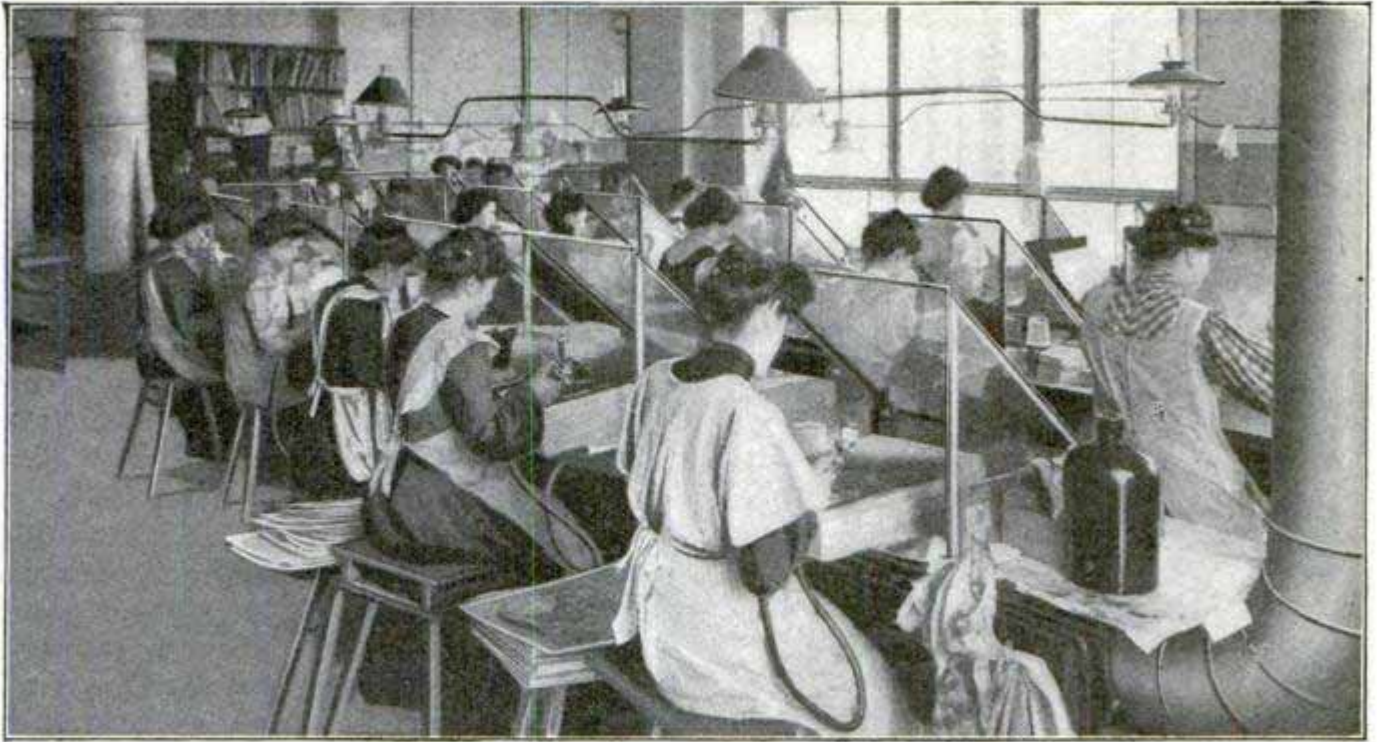
*The Siren
of the
South*



THE American boy is strictly up to date and devoted to the science of mechanics as are the boys of no other nation. The city boys especially, deprived by environment of those pastimes which their fathers as country boys enjoyed, have turned to the doing of things which can be accomplished in workshop or laboratory. Instead of roaming the woods and fields hunting gophers and wild bees' nests, building dams in brooks or fishing and boating on the river, he is restricted to the limits of some small room or attic where he sets up a little workbench and goes in for carpentry, metal working, electrical apparatus, and such things. When wireless telegraphy became a practical accomplishment, he lost no time in taking up this most fascinating of all amateur efforts. He was no longer confined to the walls of one room, but with a pole and a few wires on the roof he could reach out in every direction 10, 50, 100 miles, even farther, according to the capacity of his apparatus; while he was able frequently to pick up messages from stations or ships a thousand miles away. Amateur stations increased to such an extent, that an association was formed and a directory published giving the private call of all its members. The fascination of reaching out into space and catching messages as they dart to and fro makes the sport an especially attractive and lasting one. In fact, wireless amateurs have increased to such numbers that officers of the Navy, lake and ocean steamship lines, are complaining of the interference thus occasioned and Congress has been urged to pass restricting regulations. Other large powers have already established such regulations, and doubtless our own country will have to do the same. However, the contemplated action is not prohibitive, but provides for the register and license without charge of every radio-telegraph station, with authority vested in the President, in time of war, to close or regulate the operation of such stations as may be deemed necessary. The sending of fraudulent messages may be punished by fine or imprisonment, and distress signals from vessels at sea, and government dispatches from stations having only wireless, are to have precedence over other dispatches.

*Proposed
Regulation
of Wireless*

H. H. WINDSOR



Using Glass Hoods to Protect Girls Spraying Colors in German Novelty Factory

COMPRESSED AND EXHAUST AIR IN PAPER COLORING

Compressed air and suction conduits, which besides their obvious employment in modern industries possess the added advantages of producing efficient ventilation without undue drafts, have recently found a use in the manufacturing of colored paper goods.

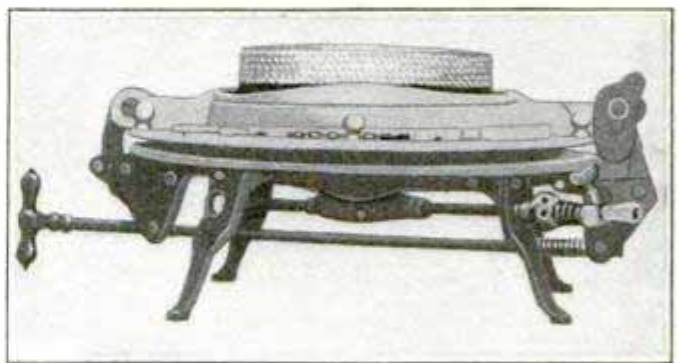
The illustration shows a room in an up-to-date factory in Berlin, Germany, where colored calendars, postcards, boxes for candies, perfumes, etc., are made in large quantities, especially for export to the color-loving inhabitants of South America. The various colors, red, blue, green and yellow, are made from aniline compounds, dissolved in alcohol. The color is contained in the small pan of a spraying device similar to an artist's air-brush, and the operator turns on the compressed air which squirts a fine spray of color over the parts of the work exposed through the pattern.

In order to catch that part of the mist of color that escapes into the air, each operator's post is surrounded by glass walls and an air suction through a slot in the table draws away the color that might escape and be inhaled,

with bad effect, by the 100 or so girls who are employed in the work. Both the air compressors and exhausters are operated by electric motors.

STRAW HAT CONFORMER

The fitting of straw hats to irregularly shaped heads without disturbing the natural form of the brim is so difficult that a special conforming machine is required. Such a machine is



Shapes the Hat without Disturbing the Natural Form of the Brim

now being placed on the market by a Chicago concern. It holds the brim in its original form while shaping the hat to the head.

MOTOR CATAMARAN FOR COACH

Coach Ellis Ward of the University of Pennsylvania instructs the college crews from a motor catamaran, con-



Coaching Rowing Crews of University of Pennsylvania in a Motor Catamaran on the Schuylkill River

structed especially for the purpose. The curious craft is capable of making 25 miles an hour, and is considered the best type of boat for the purpose afloat, as the coach can get much nearer the crews without making a swell than would be possible with an ordinary motorboat.

STARTING TACKLE FOR AEROPLANES

The commencement of an aeroplane flight is at present an undertaking requiring the help of several attendants, including a man to start the engine by turning the propeller and the men required to hold the machine back until the motor reaches the required speed. To dispense with these aids, a French airman has designed a simple apparatus consisting of a stout rope provided with a spring-actuated clutch. One end of the rope is attached to the framework of the machine in such manner that it cannot get in the way of the mechanism, and the other end, with

the clutch attached, is engaged with a short piece of rope made fast to any solid object on the ground. The spring tension of the clutch is so calculated that the clutch opens when the propeller reaches its maximum speed, and the machine, thus released, sails off into the air.

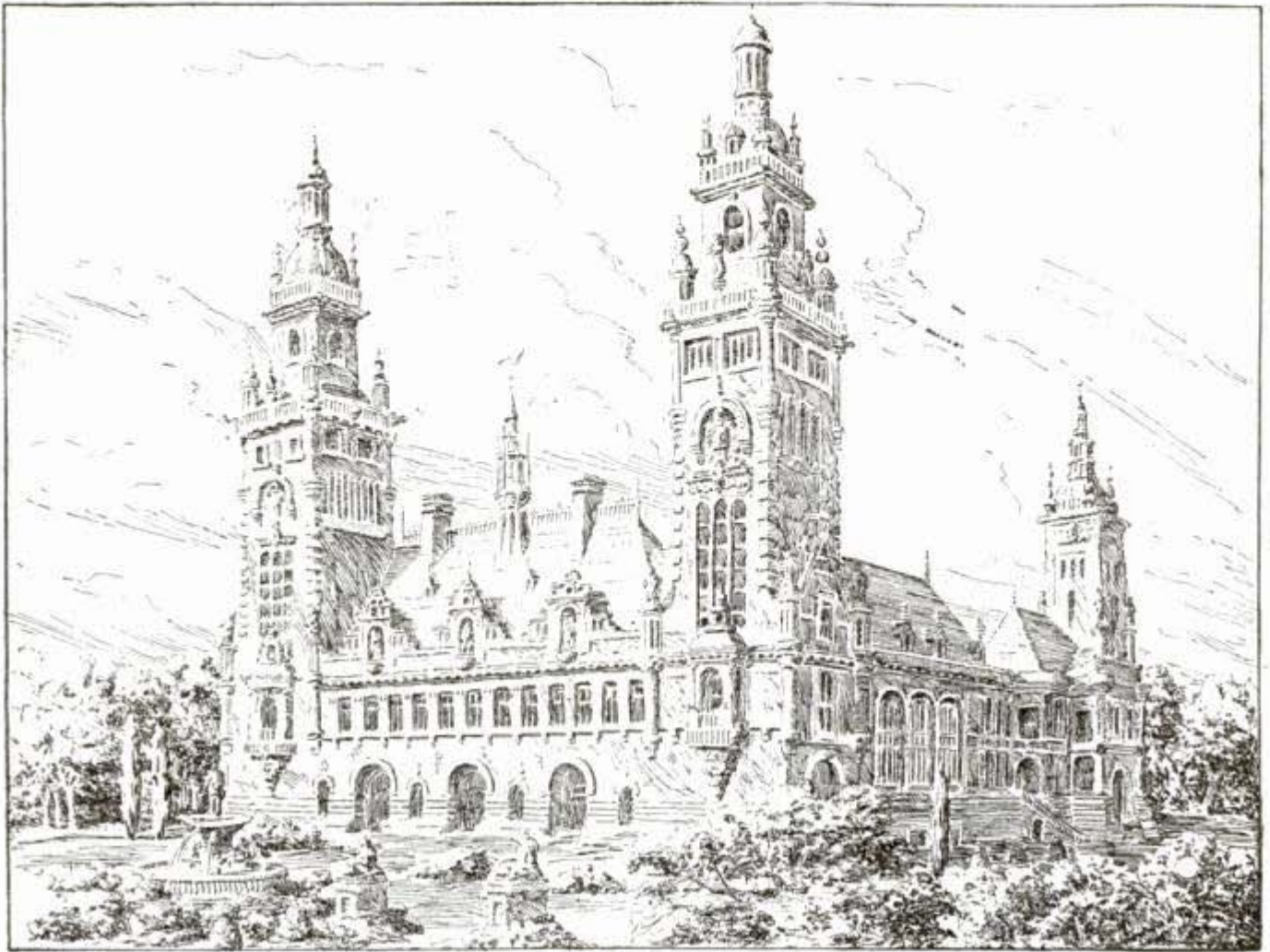
IMPERISHABLE BRONZE

Bronze statues of Buddha and Hindoo divinities are frequently found standing in the north of Siam on the sites of ancient temples that have been crumbling for centuries, mute testimonies to the time and weather-resisting qualities of the metal from which they were cast. For a long time the formula for making this bronze, or "samrit" as the natives call it, has been lost, but recently it has been discovered in an old Siamese manuscript now in the possession of the King of Siam. The following is a translation:

"Take 12 parts by weight of pure tin, melt it at a slow fire, and avoid bringing it to a red heat. Then pour

in two parts of quicksilver, stir until the latter has become thoroughly absorbed and amalgamated, and cast the mixture into a bar. Take 80 parts of refined copper and melt it, and then gradually incorporate with it the amalgam, stirring vigorously in the meantime. Now throw into the crucible a sufficient quantity of ashes obtained from the stems of the 'bua-bok' (lotus) creeper, so as to cover the molten metal. Remove the dross with an iron ladle, and the metal remaining is samrit bronze."

The percentages thus work out to be 85.11 copper, 12.76 tin, and 2.13 quicksilver. Probably some other material would do equally well as lotus ashes to bring up the dross.



The Palace of Peace at The Hague

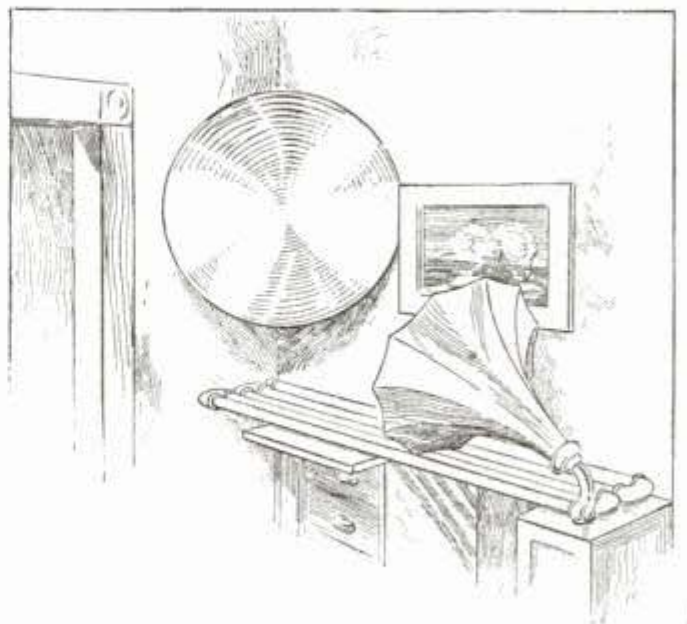
HAGUE PEACE PALACE A BEAUTIFUL STRUCTURE

The Palace of Peace at The Hague will not bring any blush of shame to the cheeks of Andrew Carnegie, as is evidenced from the accompanying illustration, which is from a drawing of the prize design by L. M. Cordonnier, of Lille, France. The prize was awarded by the Carnegie Foundation, which instituted an international competition to obtain the best ideas of architects throughout the world.

FILTERING PHONOGRAPH MUSIC WITH PEAS

The scratching and other mechanical or metallic sounds that often mar the musical tones of a phonograph, even though the records themselves are perfect, can be eradicated, according to an English inventor, by filtering the music through about 54 ft. of tubing filled with peas.

The tubing, which is of tin, 1.5 in. in diameter, is connected up in suitable lengths, as shown in the illustration. The effect of these lengths of tube when empty is to increase the



The Mechanical Sounds being Filtered Out of Phonograph Music by 54 Feet of Tin Tubing Filled with Peas and Beans

volume of the tones, but this, of course, also intensifies the disturbing noises. When the tube is filled with peas, however, the friction noises, which are short waves, are practically eliminated, while the musical tones, although a little dulled, are said to be made purer and more natural.

Greater brilliancy has been obtained by using zinc tubes instead of tin, and filling these tubes with fragments of corrugated zinc, the use of which has been protected in England by patent. A combination of the zinc with peas and beans is said to produce delightful effects.

A sense of unreality is often felt in the music apparently rising from the bottom of the horn, and to remedy this the English inventor throws the sounds against a parabolic tin reflector, so placed as to send the sounds to the other side of the room.

GERMAN UPHOLSTERY DECORATION

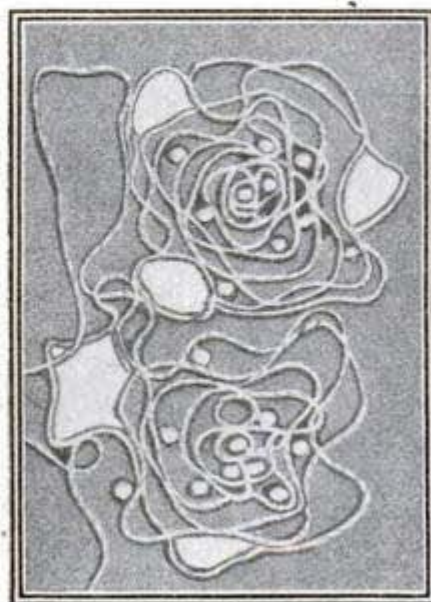
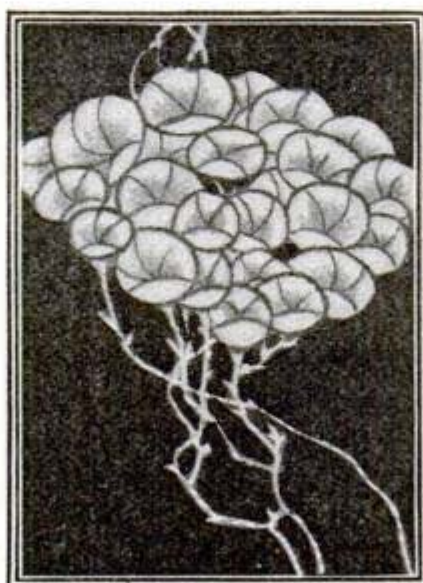
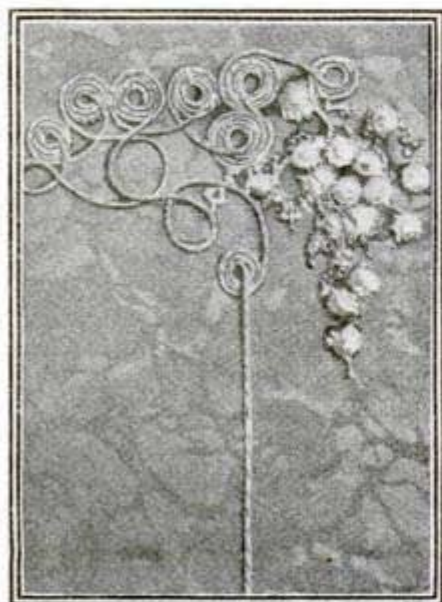
Three interesting examples of German decoration for upholstery fabrics are here shown. The designs, which are taken from aquatic plant forms are done in embroidery, appliqué cording and jewels. The work may be superimposed on the body of the fabric, irrespective of any pattern which it may already carry.

OLD SAILING SHIP TO BE CANNING FACTORY

The old American ship, "Glory of the Seas," which has carried the Stars and Stripes to every port of importance in the world, having come upon evil days, is to have an unusual fate. A canning company has purchased the vessel and will convert it into a modern salmon-packing plant, tow it to Alaska, and shift it about to wherever the fish are running best. The plan has the advantage of taking the cannery to the fish instead of depending upon carrying the fish from the traps to the cannery. When nearby traps are empty and the salmon are only visiting those far away, the loss of time—and time determines the success or failure of modern salmon packing—is considerable, and means an appreciable difference in dollars and cents.

The old ship was recently bought at a public sale held to satisfy a libel. The vessel is 240 ft. long, has a 40-ft. beam, and it is estimated that as much floor space can be secured as is necessary for a modern packing plant. The cannery employes will be lodged on the upper deck and the machinery will be placed on the main deck. The hold will be used for storing the tinned product.

The "Glory of the Seas" was built in 1869 by D. McKay of Boston. It is

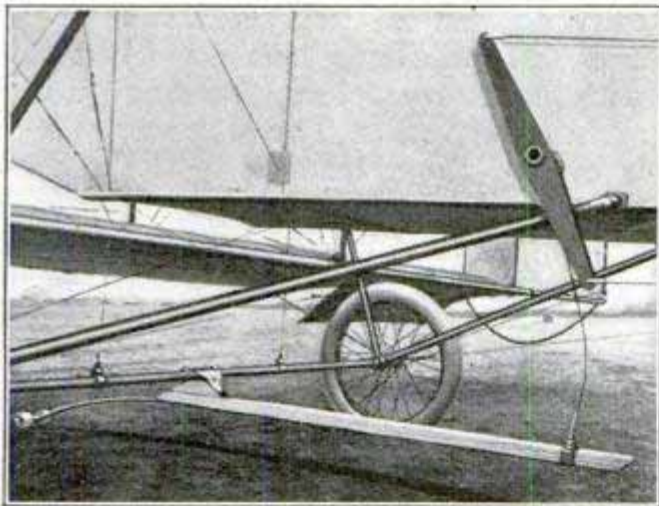


Decoration of Upholstery Fabrics by Embroidery, Applique Cording and Jewels

only within the past year or so that the vessel has been demeaned by traveling at the end of a towing hawser, but her best days are past and the decks that once echoed to sailing orders and the shriek of the gale will now reverberate with the rattle of canning machinery.

BRAKE FOR AEROPLANES ON GROUND

A number of accidents have happened to aeroplanes because of the difficulty of bringing them to a stop after alighting. Sometimes machines have continued to run along under their own momentum until they crashed into trees, walls, or other obstructions. To overcome this the latest Voisin model, "Le Canard," has been pro-

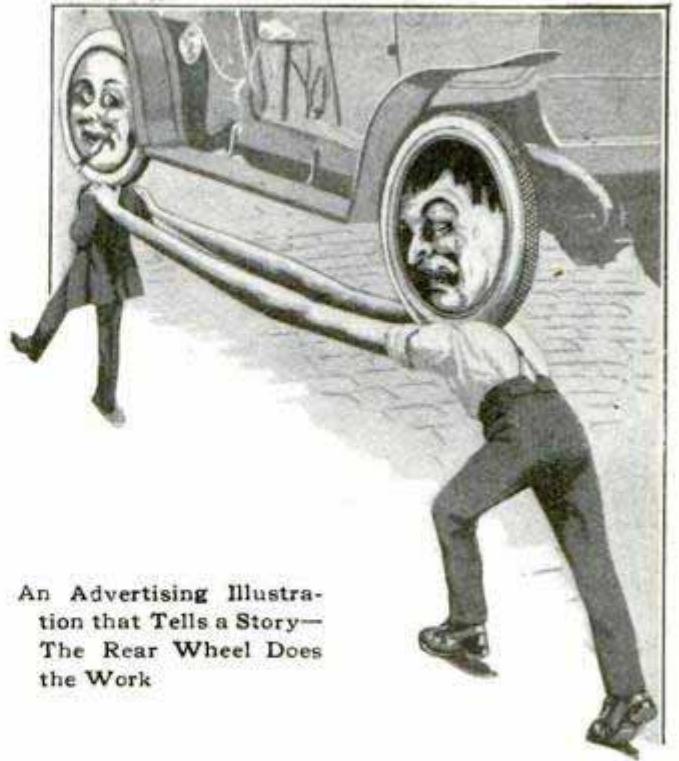


A Device to Bring Aeroplane to a Stop on Ground

vided with a brake with small rollers at the end which comes into contact with the ground. On landing, if there are obstructions ahead, the pilot applies the brake just as in an automobile, and brings his machine to a stop.

"LIVE" ADVERTISING IN FRANCE

The advertising illustration here reproduced has been the recipient of much comment abroad because of its "liveness." The less heavily tired front wheels of the automobile are skipping along, light of foot and smiling, because pushed by the more heavily tired



An Advertising Illustration that Tells a Story—The Rear Wheel Does the Work

rear wheels, which do all the work, and are consequently under a continual strain, the extent of which is graphically depicted in the agony of the face in the rear tire.

CARRYING THE MAILS IN PERSIA

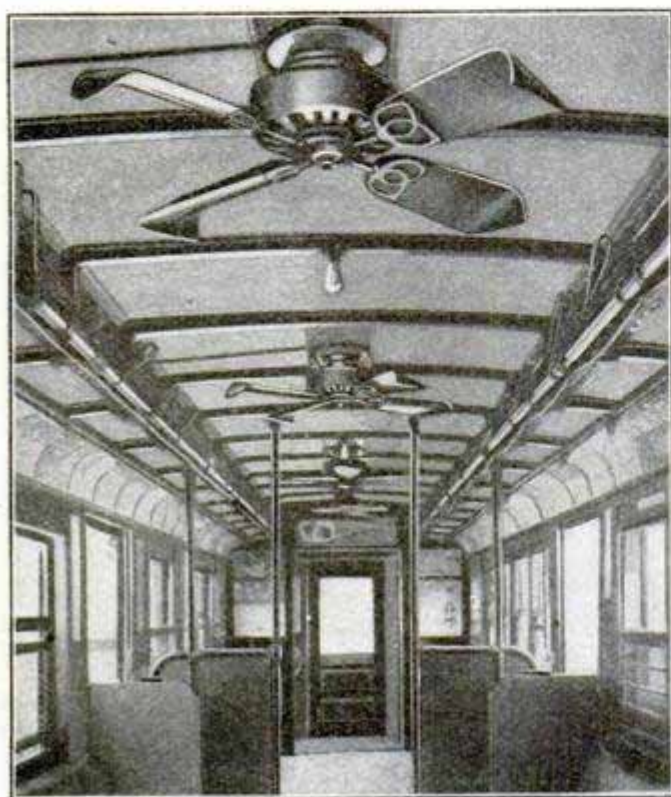
The four-horse team used on the Persian mail carts differs from ours, as the horses are harnessed four abreast. As the roads are beset with highwaymen, four guards ride with the mail, and they are none too many, as numerous robberies by armed brigands have taken place in spite of all precautions.



The Four-Horse Persian Mail Cart

ELECTRIC CEILING FANS IN SUBWAY CAR

Lack of proper ventilation in the New York subways at first caused considerable trouble, and while this was



Electric Fans of Special Design in New York Subway Car

later overcome to a great extent, it was thought that fans installed in the cars might reduce considerably the discomfort of passengers on the subway trains. After several tests with different kinds of fans, it was found that a ceiling fan with short blades and curved tips was most efficient in operation, this type of fan being especially designed to give the best possible air circulation with the limitations imposed by the shape of the car roofs.

FLYING AS A CURE FOR "NERVES"

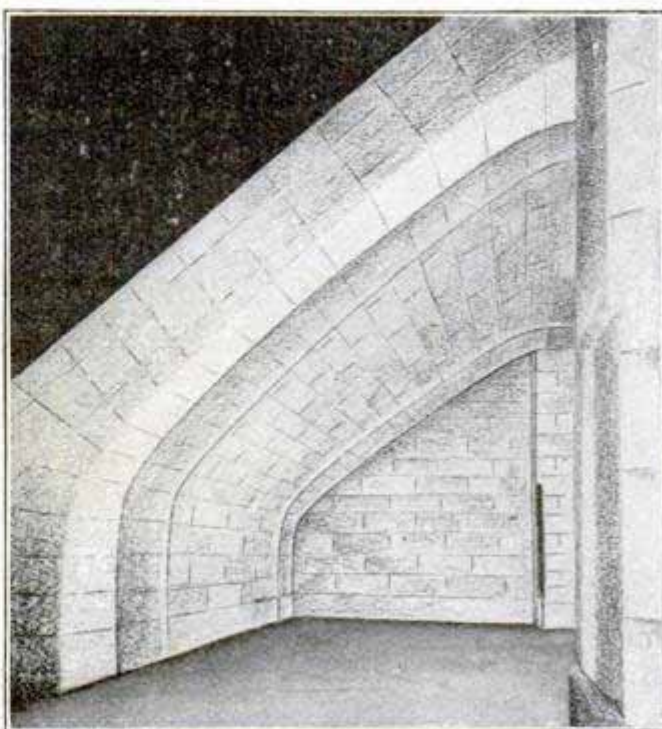
The physician in charge of a Paris sanitarium expresses the belief that aerial flight would prove an excellent stimulating treatment in cases of nervous debility, despondency and like nervous disorders. It would, in his opinion, help to restore mental equilibrium, the absorbing novelty of the

sensation and the attendant danger serving to drive away fixed ideas, to energize the vitality, and awaken the instinct of self-preservation and the desire to live.

The physician in question does not think the idea radical, and designates aerial flight as a simple and eminently healthful sport. Motoring has proved beneficial to nervous patients of his institution, and he is confident that flying will prove equally helpful.

SELF-SUPPORTING MARBLE STAIRWAY

One of the self-supporting marble stairways of the new home of the New York Public Library, which has been under construction for some years, is shown in this illustration. The entire structure has been erected with practically no vertical structural steel members, all problems being worked out with masonry piers, bearing walls, arches and vaults. The stairway shown is one of those leading to the second floor in the main rotunda. They are self-supporting, being in reality marble arches with springing lines at different elevations. The ceiling of the rotunda is a self-supporting marble vault of 41-ft. span and 61 ft. long.



One of the Self-Supporting Marble Stairways of the New York Public Library

Pheasant Raising

for Profit



By J. E. STEVENS

LITTLE does the fortunate guest of the millionaire owner of a big game preserve realize how much he is indebted to the meek and lowly hen for the success of his day's "sport"! For the ordinary, speckled, or unspeckled, female member of the species chicken has become the step-mother of fashionable hunting, the willing and ready provider of victims for the wealthy, indolent hunter who would save himself the all-day tramp of the old-time sportsman by doing his "shooting" in a nice shady place, to which he is conveyed in a modern motor car, with a man to load his guns and clean them and another to locate the game and drive it toward him.

In several sections of the country there are located "game" farms where "wild" birds are raised by the thousands to be sold to the owners of big country estates so that their game preserves may be stocked with every imaginable species of fowl, those of the water, of the field and of the woods—depending on the nature of the country included in the estate.

From a quiet residence suburb of Chicago, thousands of crates and baskets are shipped each year, the crates enclosing pheasants, wild geese and wild ducks, and the baskets containing eggs of the various game birds bred on a game-propagating farm situated on the east bank of the Desplaines River.

The owner of this farm, when only 15 years old, commenced raising a

few game birds in his back yard, in Oak Park, Illinois, and after one year the business prospered so that it became necessary to acquire some additional space, equal to several town lots. After a few years, even the enlarged grounds became too small and he removed to his present location, starting with 100 acres, and today, at the age of 25, he has 370 acres of land under his control, improved with a residence, grist-mill, electric light and water plant, several game-keeper's cottages, and barns. Nearly 2,000,000 sq. ft. of wire fencing is used for runs, aviaries and other enclosures. Some idea of the extent of this enterprise can be gained from the statement that for hatching purposes alone 1,500 setting hens are used.

Common barnyard hens are used for hatching eggs and caring for the chicks of pheasants and most of the wild water fowl; this makes the young quite tame. The old barnyard hen is quite a sensible old lady and can always be depended upon. She is not easily startled or driven from the nest, as is the case with pheasant hens in captivity.

The baby pheasants follow their proud foster-mothers and flop their wings in imitation of their real parents. Before many days have passed, the little pheasants' wings must be clipped or they would use their birthright and go on "joy flies." The little ducks and geese are provided with ponds where they can swim



has been found that the English, Golden, Silver, Lady Amherst and Reeves are the easiest and most profitable to handle in great numbers.

Besides numerous small breeders, there are in this country about five large farms on which thousands of pheasants are raised each year. Twelve or more state agriculture departments are actively interested in propagating English pheasants and, while some states have a short season for shooting, others are closed until 1913, and in some cases until 1915.

Like agriculture or chicken-raising, pheasant breeding opens the door to independence and assures a substantial



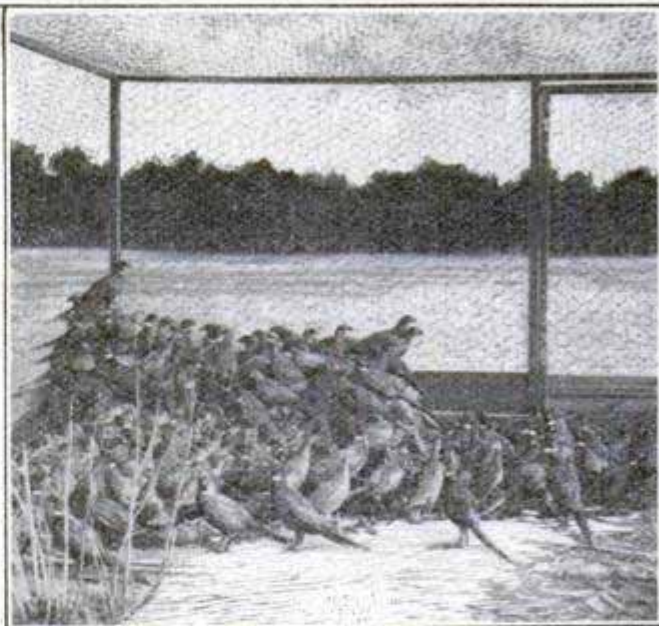
1— Silver Pheasant. 2— English Pheasants out in the Snow. They Need no Housing Even during the Coldest Weather

and play. Mother hen stands on the bank astonished beyond understanding when her offspring take to the water.

In the fields may be seen flocks of young golden and silver pheasants about a year old, the plumage of the males just suggesting the variegated colors that will become more distinct and gorgeous as they grow older. The older birds, in all their magnificent splendor, occupy numerous runs.

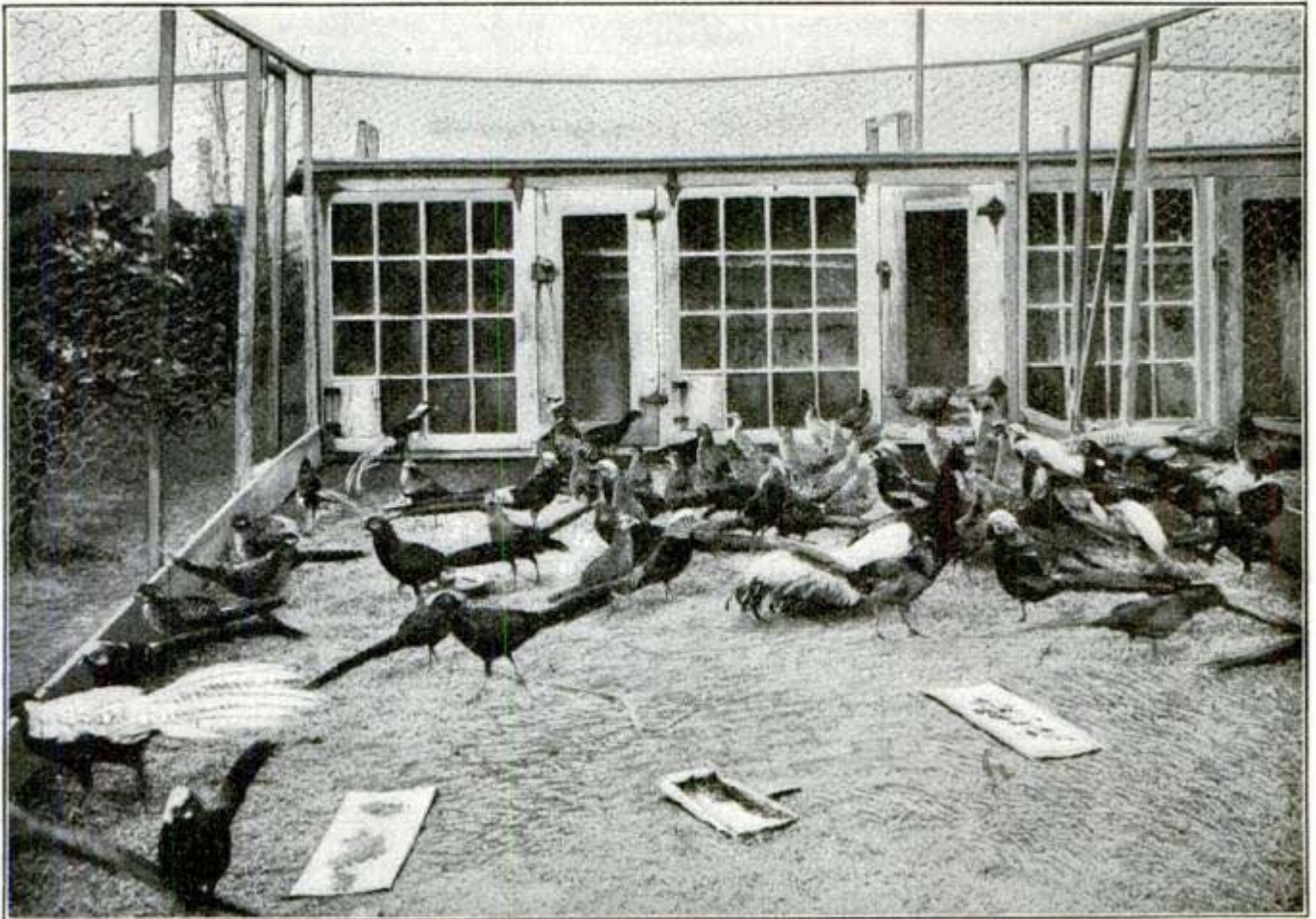
The female pheasant's plumage is almost somber beside that of the male, but what the hen lacks in brilliant coloring she makes up in grace and quiet elegance.

There are scores of varieties of pheasants, but after much experimenting, it



English Pheasants Ready for the Shipping Crates

income. Anyone who has had successful experience raising domestic fowl is qualified to undertake pheasant



Golden, Amherst and Silver Pheasants—The Pens in This Picture are Used for Winter Quarters and for Breeding Yards in the Spring

breeding. Young pheasants, however, because of their nervous temperament, need more attention than chickens. Golden, Silver, Amherst and Reeves pheasants, because of their ornamental raiment and majestic bearing are in great demand for private and public parks and aviaries. The English ring-neck breed, the great game-bird of the family, bring the biggest returns, however. There is an ever-increasing call for them, and at the present time it is impossible to get birds in great enough numbers to re-stock game preserves. Ring-neck pheasants are very prolific, the hen in captivity lays from 50 to 75 eggs in a season; eggs hatch in from 23 to 24 days, and the young are in full plumage when about six months old. They sell for about five or six dollars a pair.

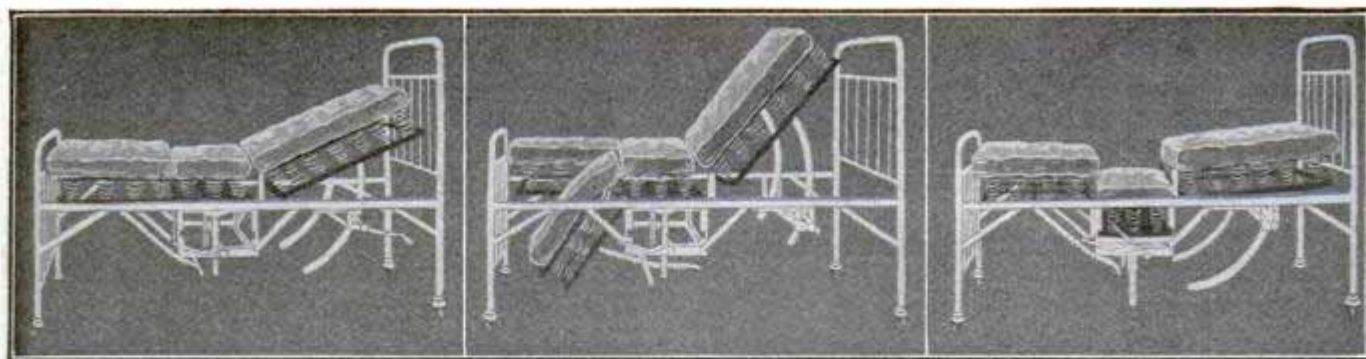
It is not necessary to house pheasants closely. All they need is a dry place to roost in and run under during the wet, cold weather. Pens can be made like an ordinary chicken house

with runs 25 to 50 ft. long and about 8 ft. wide, covered with wire netting. This enclosure is large enough for 25 birds during the winter months, and is about right for a trio or sextette during the laying season in spring and summer.

The beginner never should buy wild imported pheasants because by the time they are acclimated and sufficiently tamed for breeding in pens, they are too old for breeding.

¶The constructors of the Wright aeroplanes in France are experimenting with a variable-speed motor, the speed of which can be varied between 700 and 1,500 revolutions per minute during the flight.

¶A complete skeleton of a four-toed horse, found in the Big Horn Basin in Wyoming, has been mounted and placed in the American Museum of Natural History in New York.



Forward End of Spring Slightly Raised

Bed Converted into Chair

The Middle Section Dropped

ADJUSTABLE INVALID BED

An invalid bed adjustable to any practical position, designed for the hospital or for the home and perfectly comfortable for ordinary use, is shown in the accompanying illustrations in three positions. The recovery of patients is hastened by enabling them to sit up gradually, and the first stage of this gradual rising is shown in the first illustration. The third and final stage of the sitting-up process is shown in the second illustration. The patient can be easily changed to the sitting posture,

and the end of the spring may be dropped to the whole or one-half of its width, which is of special advantage in case of a fracture of one leg, the injured leg being held straight while the other can be placed in any position desired. The middle section may be dropped as shown in the third illustration.

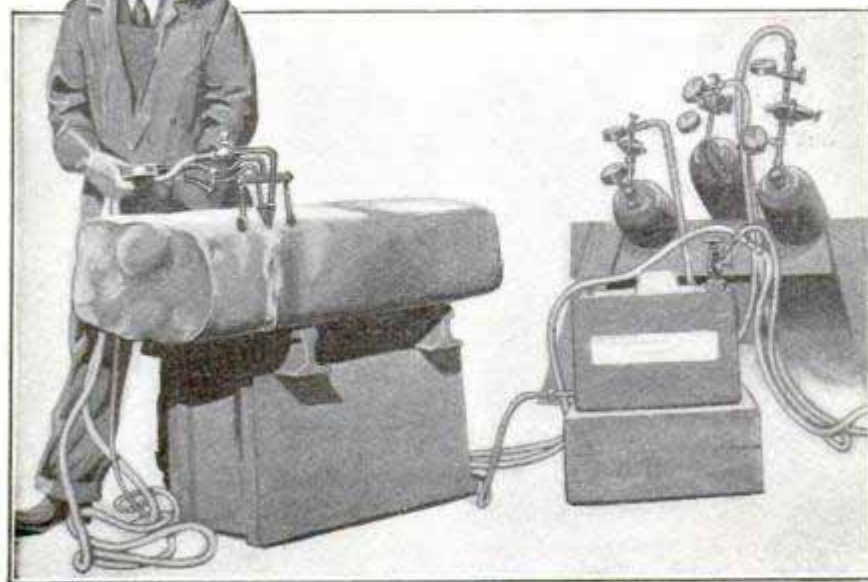
Recent tests on the ashes from a Brooklyn electric company's boilers showed from 8 to 12 per cent of combustible matter.

OXYGEN-HYDROGEN TORCHES FOR CUTTING METALS

A system for cutting metals with heat, similar to the oxygen-acetylene process, but utilizing hydrogen in place of acetylene, has been invented by a Belgian and is now being

placed on the American market. In the oxygen-hydrogen system, a double or triple-jet torch is used. If the former, one of the jets delivers mixed oxygen and hydrogen to heat the metal, and the other jet delivers oxygen to cut it. The heat of the first jet makes the oxide formed by the second jet sufficiently fluid to flow away rapidly, and the cut made is clean and regular, like that of a saw.

Several plants are being established for the manufacture of the gases, which are compressed in steel tanks or bottles and shipped to the various industries using the process. In using the process for light work, two bottles are placed side by side



Cutting a Heavy Piece of Steel with a Triple-Nozzle Oxygen-Hydrogen Torch

and the double-nozzle torch is utilized, but in exceptionally heavy work the torch is a 3-nozzle affair and three bottles are used. In the latter, the third nozzle is an after-heater, which keeps hot the iron oxide caused by the cutting and blows it away.

LIVING MODELS EXHIBIT STYLES ON SHIPBOARD

Owing to the fact that the mannequins or live models parading the latest fashions in the shape of harem skirts were recently treated with scant respect at the French race meets and on the streets, the great women's apparel firms of Paris have started an innovation. It consists of exhibiting the latest fashions on board ship, and especially on the ships running between France and England, and France and the Mediterranean ports.

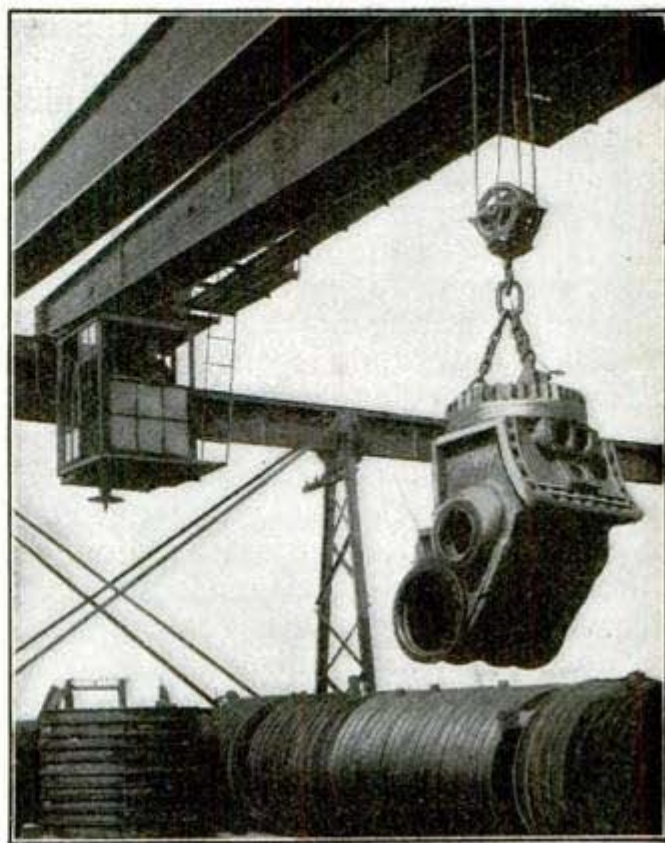
Whether the idea will prove successful or not is a question, as a rolling ship is not the best medium for the display of frocks, and a big hat is troublesome in a brisk wind.



Mannequins Showing the Latest Styles at Sea

ELECTROMAGNET LIFTS TWO-TON CASTING

The remarkable lifting power of the electromagnet is clearly indicated in



Electromagnet Lifting a 4,100-Lb. Locomotive Saddle Casting

the accompanying illustration, which shows such a magnet lifting a locomotive saddle casting weighing 4,100 lb. The crane is in operation at the locomotive plant of the Chicago, Rock Island & Pacific Railroad.

ANNUAL RAT-KILLING DAY

Although the war on rats is waged more or less persistently all the year around, Gibson County, Ind., has an annual rat-killing day, at which time the most strenuous kind of measures are taken. The observance of the second annual rat day occurred in June, at which time 4,000 rats were slaughtered. The government estimates that each rat costs two cents a day for maintenance, so Gibson County by this slaughter saved nearly \$30,000 for a year, to say nothing of the saving from future descendants of the rodents thus killed.

MAPPING FRANCE FOR THE AIRMEN

The map reproduced in the accompanying illustration is part of the first chart issued by the topographical corps of the French army for the use of airmen. Mathematically exact as to distances, it is also a faithful guide as to ground conditions and gives all the information of the ordinary military charts as well as the data of special interest to the aerial corps. Each chart is about 15 by 35 in. in dimension, representing an area of about 50 by 80 miles, and is printed in six colors, each color having its distinctive purpose.

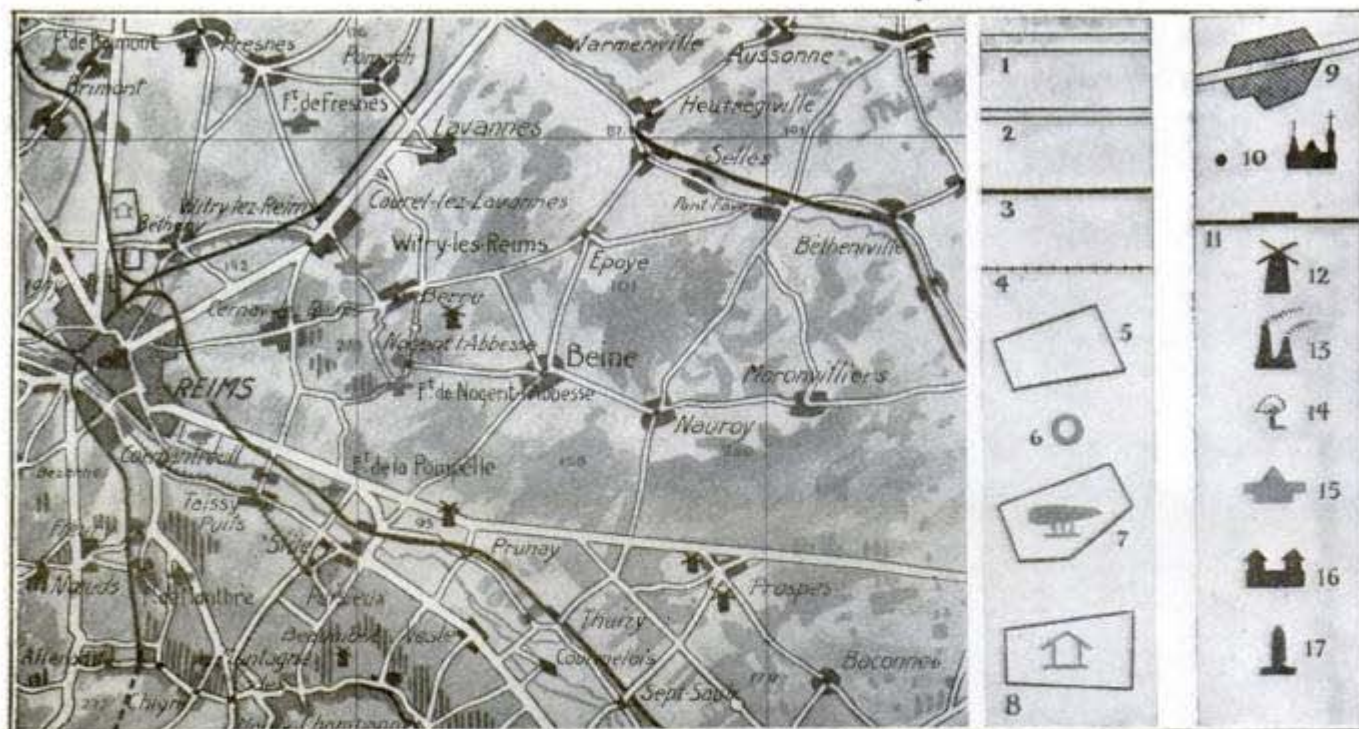
The network of roads stands out in white from the light yellow ground color. The water courses are done in bluish silver, and the woods are dark green. The signs designating railroads, castles, windmills, isolated trees and churches are in black. The sign used to denote churches gives a true outline of each distinctive church edifice, while the signs denoting castles, factories, etc., are simply conventional. The signs showing inhabited localities,

fortifications, and dangerous landing places as well as aviation hangars and sheds, are printed in red while aviation fields are white. A series of red bars denote overhead wires, vineyards, fruit orchards, gardens, cattle inclosures, grounds traversed by ditches, etc.

MOTOR-LIGHTER MAKES 2,000-MILE VOYAGE

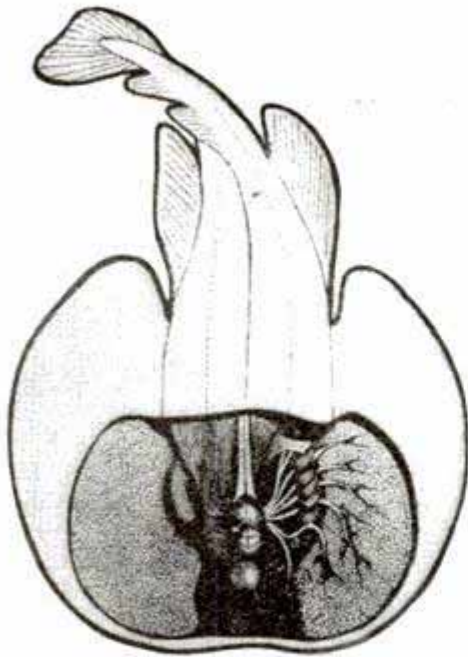
The motor-lighter "Crudoleo," so named because her motors run on crude oil, recently made a voyage of about 2,000 miles under her own power, running into heavy weather on the trip from Havana to Port of Spain, Trinidad, and once having to be headed into a gale for two days.

The vessel, which is 70 ft. long, 16 ft. beam, and draws 7 ft. of water when loaded with 100 tons, was built in England, and sent in tow as far as Havana. She will be used to carry asphalt between Port of Spain, Trinidad, and the South American Continent.



FRENCH AIR MAP AND SIGNS DENOTING THE NATURE OF THE COUNTRY

No. 1, Public Roads; 2, Small Roads; 3, Single or Double-Track Railways; 4, Trolley Lines; 5, Aviation Fields; 6, Depots of Hydrogen Gas; 7, Sheds and Stations for Dirigibles; 8, Hangars and Stations for Aeroplanes; 9, Inhabited Localities; 10, Churches; 11, Railroad Stations and Train Sheds; 12, Windmills; 13, Factories; 14, Isolated Trees; 15, Forts; 16, Castles; 17, Isolated Monuments and Milestones



(After Parker)

Diagram Showing the Natural Battery and Connections of the Electric Ray



The Electric Ray Which was Caught Off Florida Coast

CAPTIVE ELECTRIC FISH HAS FOURTEEN YOUNG

A fine specimen of the electric ray or torpedo fish, 17 by 9 in. in size and weighing about 2 lb., which was recently caught off the coast of Florida and forwarded to A. G. Reynolds, a local scientist, gave birth to 14 young ones in the laboratory. This is the first recorded instance of such an occurrence, and the incident was considered so unique that the mother fish with her offspring, cured in formaldehyde, have been placed in the U. S. National Museum at Washington, D. C. The young fish measure about $3\frac{1}{2}$ in. long by 2 in. broad, and comprise nine males and five females.

As the fish was dead when it was received, the birth of the young being forced, a fine chance for experimenting with this natural

electric battery was lost. But other scientists have been more fortunate, Russell J. Coles, a well known naturalist, recently captured 11 specimens of the fish at Cape Lookout, and records the capture of more than a dozen more by native fishermen. Mr. Coles,

although he was knocked down many times by the electric shock of the fish while he was experimenting with them, succeeded in making several tests, but with only negative results. Thus he was able to record that the peculiar form of electricity given out by the fish had no effect on a battery-testing ammeter, nor would it light a little electric lamp which required only 2.5 volts. He suggests that the electric discharges might have been recorded by a voltmeter, but



The 14 Little Electric Fishes

such an instrument was not available. From which it would seem that the quantity of electricity stored up by the fish is very small, but of a very high voltage, so that its quality is probably similar to the secondary current of an induction coil or to the static discharge of a Leyden jar or other form of electrical condenser.

Dr. Günther, in his "Study of Fishes," states that the electric organs with which these fish are armed are large, flat, uniform bodies, lying one on each side of the head, and consist of a large number of vertical, hexagonal prisms. These form cells which are filled with a clear, trembling, jelly-like fluid, and are connected with the nerve system of the fish. One scientist counted 470 prisms in each battery

of a certain species of the electric fish, and it has been shown beyond a reasonable doubt that the fish gives the electric shock voluntarily, when it is excited to do so in self-defense or to stun or kill its prey. To obtain a shock by contact, it is necessary to touch two parts of the fish at the same time, and it is said by some that a painful sensation may be produced by a discharge conveyed through the medium of a stream of water. The electric currents created in these fishes, says Dr. Günther, exercise all the known powers of electricity; they render the needle magnetic, decompose chemical compounds, and emit the spark. The dorsal surface of the electric organ is positive, and the ventral surface negative.

AUTOMATIC DEVICE FOR STOPPING TRAINS

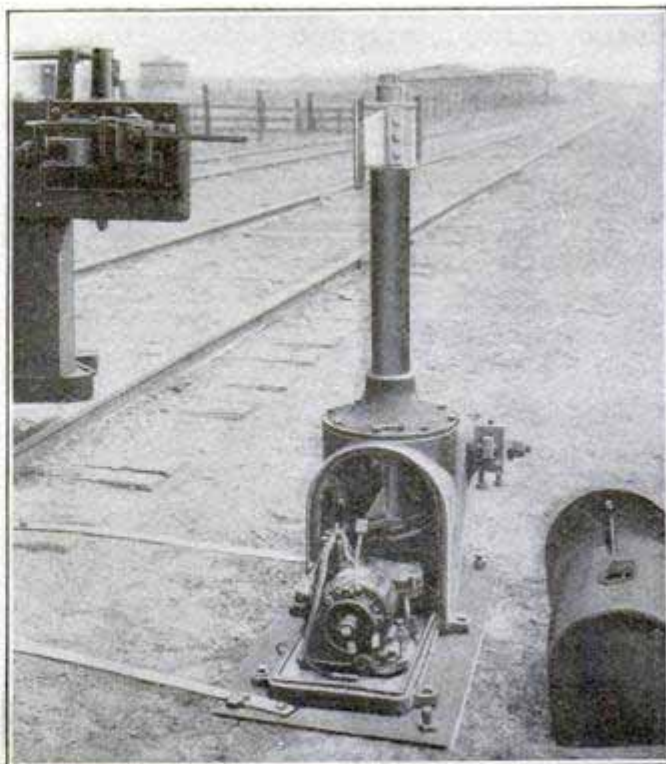
There have been innumerable inventions designed for automatically stopping trains, but few have been seriously considered or even recognized by the U. S. Interstate Commerce Commission. It is claimed, however, that

this device has just been given its four-hundredth test by the government on the Pere Marquette Railroad at Saginaw, Mich., and that its practicability has been thoroughly demonstrated.

The apparatus consists of a flexible



A Locomotive Approaching the Automatic Stop Arm. The Projection Which Strikes the Arm and Thus Brings the Engine to a Stop is Clearly Shown



View of the Standard with Automatic Stop Arm out of Operative Position, and Showing the Operative Mechanism on the Locomotive



Unloading a Car by Exploding Dynamite

steel arm set on a low standard beside the track, and a mechanism provided with a thin steel projection mounted on the front of each locomotive. When the track is clear, the steel arm on the standard is set parallel with the track, and is out of operation, but when the track is not clear, the arm is set at right angles to the rails. In this position it comes in contact with the steel projection on the locomotive and pushes it back, this operation opening the steam valve and applying the air brakes, thus automatically bringing the train to a stop.

The installation of the apparatus is said to be comparatively inexpensive, and it works in conjunction with any existing train-control apparatus. In operation with the block-signal system, for instance, it prevents the train from entering a block, regardless of the action or lack of action of the locomotive engineer, when another train is running in the same block.

It is claimed that every test of the apparatus has been successful, whether the trains were running at 6 or 75 miles an hour, with light engines and heavily loaded trains, in all conditions of weather and track.

☐Property owners in New Jersey have lost \$4,500,000 in chestnut trees within the last few years, owing to the chestnut bark disease.

UNUSUAL WAY TO DISPOSE OF 48-TON FOUNDATION

The wrecking of concrete structures and foundations is usually a difficult task, but the 48-ton concrete foundation of a turbine at an electric plant in Kern City, Cal., was easily wrecked in the following manner: The foundation was first chipped at the four corners and a hole driven through the center. Then it was broken into three pieces, and each piece separately picked up by a crane and laid on a flatcar. The car was then drawn onto a bridge about a mile distant, several small charges of dynamite were suitably placed, and the three masses of concrete were blown to pieces off the car without damage to either the car or the bridge.

DON QUIXOTE A STUDY FOR INSANITY EXPERTS

That Cervantes, in creating his immortal hero, Don Quixote de la Mancha, not only furnished recreation for fun-loving generations past, present, and future, but unwittingly wrote a standard work on insanity, is, according to the French magazine "La Nature," a fact acknowledged by psychologists of both the past and present.

Thomas Sydenham, a famous physician practicing in London some 60

years after the first Spanish edition of Don Quixote had appeared, is said to have advised one of his scholars to read Cervantes' masterpiece when he inquired for an authoritative work on insanity. A Spanish bibliographer also declares that psychologists should be the most competent critics of Don Quixote, and medical authorities have, through past centuries and as late as 1909, written essays on the insanity of Don Quixote. He is declared to be a perfect type of a monomaniac with delusions of persecution and personal greatness.

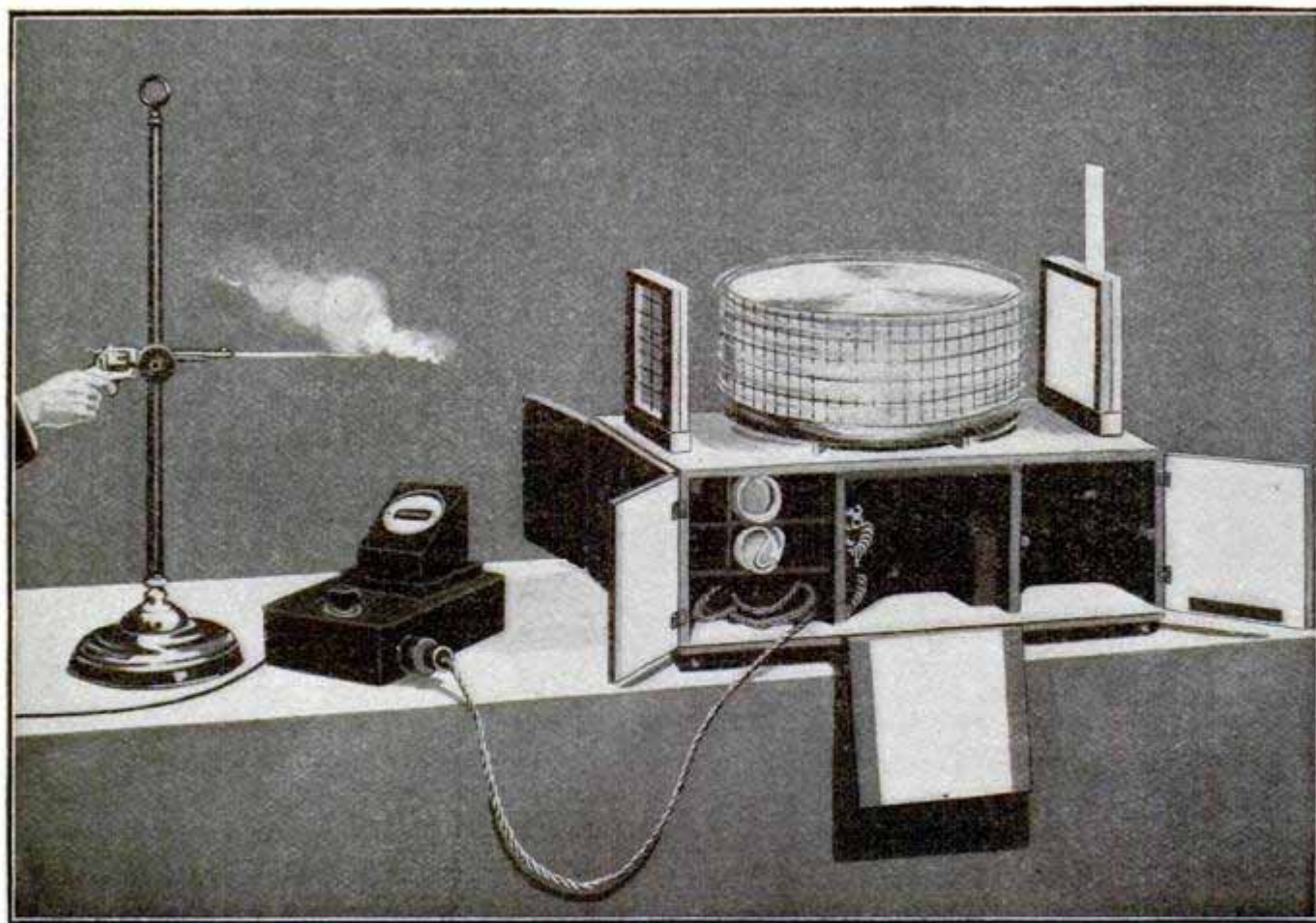
APPARATUS MEASURES THE SPEED OF PROJECTILES

An apparatus for measuring the velocity of rifle or revolver bullets, designed by a German inventor, is here illustrated. It consists essentially of a rotating drum, into which the projectile is discharged, and the necessary rotating power and recording

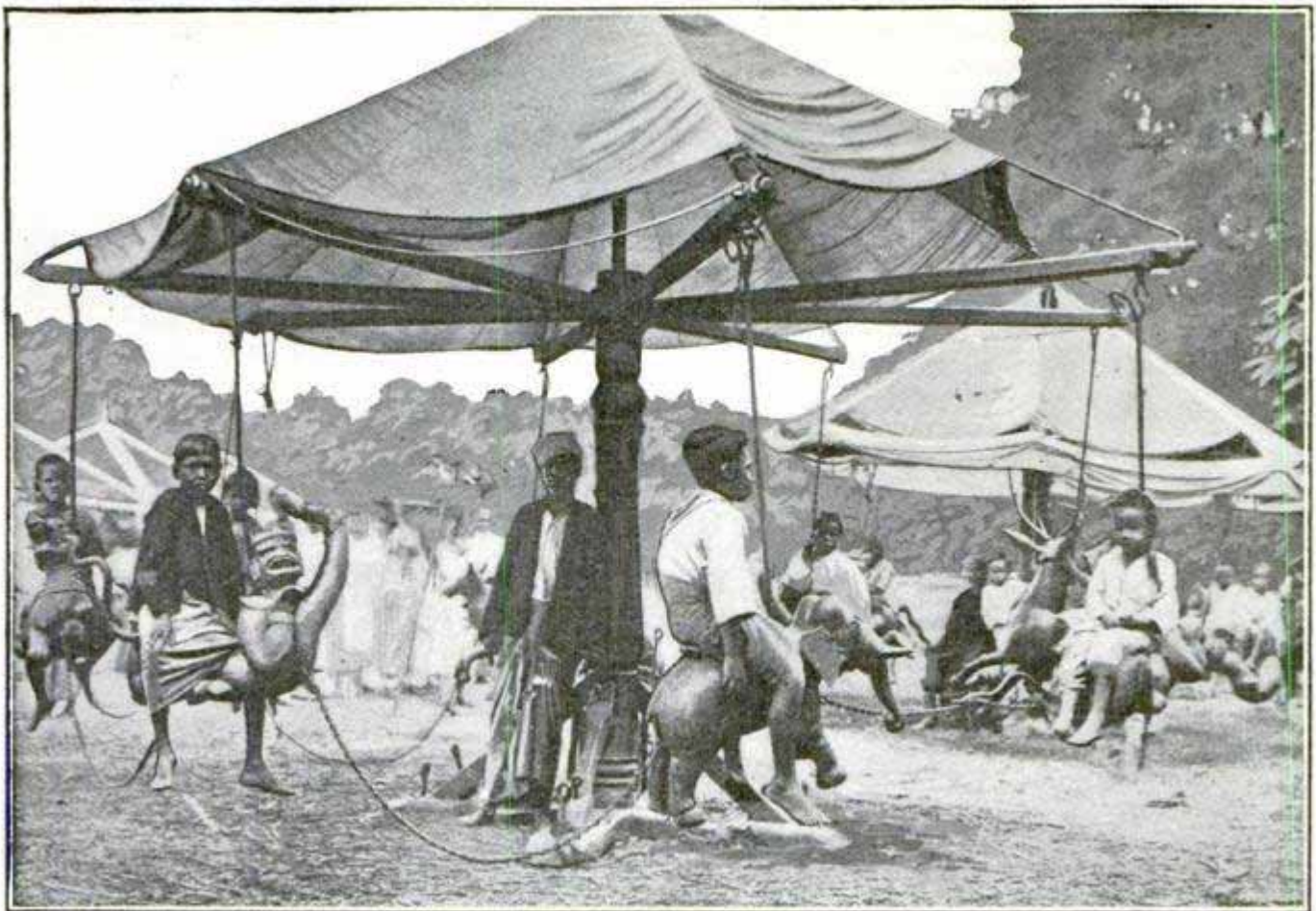
instruments. Were the drum stationary, the bullet would enter and escape at opposite points, but when the drum is rotated the exit point of the bullet is correspondingly displaced. The diameter and the velocity of the drum being known, it is a simple matter to calculate the velocity of the projectile.

It is, however, rather difficult under test to dispose the gun so that the bullet will strike the drum absolutely centrally, therefore two screens are placed at the same distance in front of and behind the drum, thus making it possible to determine the length of the bullet's path through the drum even when it does not strike the latter centrally.

¶The largest aeroplane in France is a Farman machine with a wing span of 65 ft., and a speed of only $21\frac{3}{4}$ miles an hour. The smallest is a Deperdussin aeroplane having a lifting surface of only a little more than 100 sq. ft., and a speed of 75 miles an hour.



Bullet Discharged into Rotating Drum as a Means of Measuring Its Velocity



Burmese Children Enjoying a Ride on the Fantastic Wooden Animals of the Burmese Merry-Go-Round

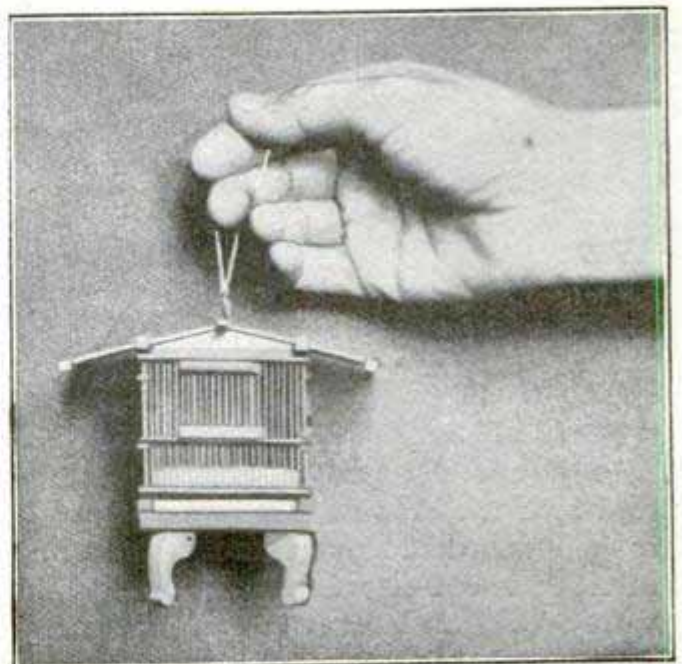
BURMESE MERRY-GO-ROUND

To the children of America, familiar with the conventionally designed wooden horses, lions, deer, zebras, etc., of the ordinary American merry-go-round, the fantastic model animals and queer idol-like creatures of a Burmese merry-go-round would probably seem wonderful, and perhaps engender fear. The ordinary Burmese merry-go-round—and such amusement devices are as popular in that Asiatic country as in the United States—consists of a tall standard from which a number of beams radiate like spokes of a wheel. The animals on which the children ride are hung from the ends of these beams by ropes and are chained together. The merry-go-round is sent swinging around by the man in the center.

Alfred B. Burk, of Philadelphia, has constructed an artistic greenhouse of plate glass, masonry and steel, occupying a ground space of 100 by 300 ft.

CAGES FOR SINGING INSECTS

The Japanese keep singing insects much in the same way as we do canary birds. Several species of insects, but particularly a kind of cricket, are domesticated in this manner, being imprisoned in the daintiest of little cages.



Japanese Cages for Singing Insects

It is commonly believed that they bring good luck to the household. Certain shops in Tokio and other cities are wholly devoted to the sale of such cages and their tiny occupants.

BUILDING A CHIMNEY IN SINGAPORE

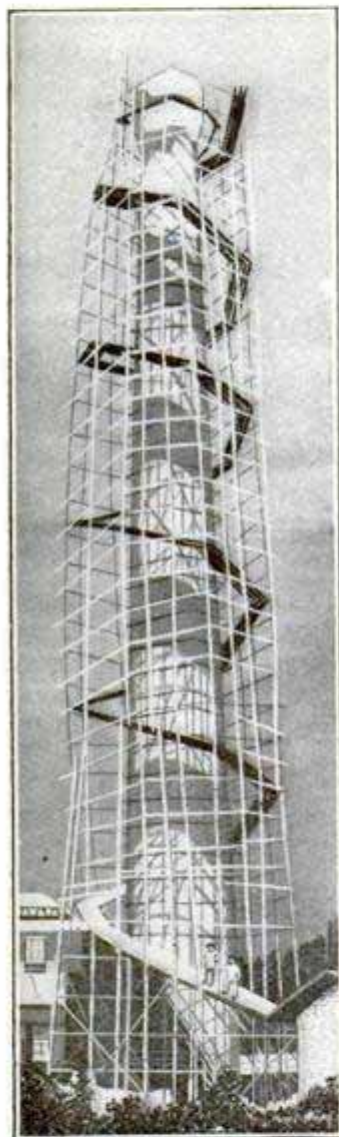
In the erection of a chimney for the refuse destructor which is to handle

all the refuse of the city of Singapore, in the Straits Settlements, the Chinese and Malay workmen used their own method of scaffolding construction. The building of scaffoldings of bamboo is said to be still much preferred over European and American methods in countries where labor is cheap and bamboos are plentiful.

Among the several up-to-date conveniences provided for passengers on American trains may now be added a manicure, an express,

running between New York and Chicago, being one train, at least, so equipped.

The latest sea-serpent story caused a New York Times reporter to add two new words to our increasing aeronautical vocabulary, as he told in graphic fashion how the "aeroplanic serpent" passed on "its 'monoplanic' way."



ORANGE-RED UNDERCLOTHES NOT EFFECTIVE

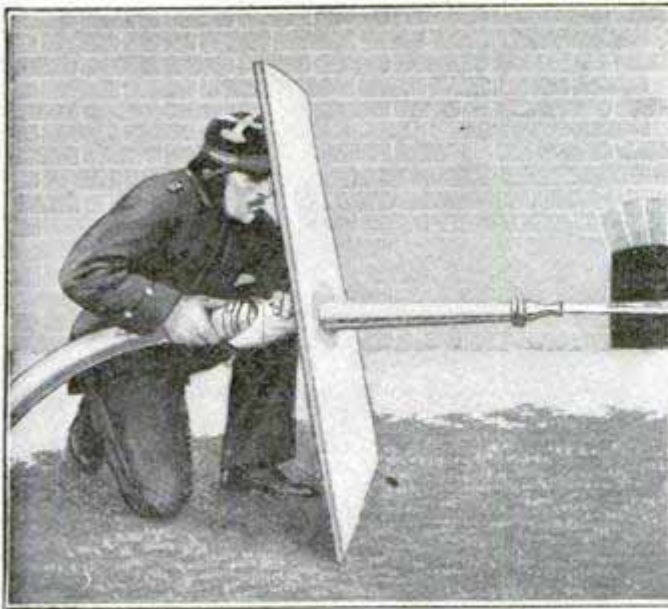
The theory that the deterioration of the white man in the tropics is due more to the actinic rays of the sun than to exposure to excessive heat, led the medical corps of the U. S. army to test orange-red underclothing in the Philippines, as this color is known to resist the actinic rays of the sun.

The tests were carried out by equipping 500 soldiers with orange-red underclothing, and 500 with white underclothing, the two sets of men being selected from the same companies and divided in a manner that made them as nearly as possible equal in physique. The exceptionally weak and those having long tropical experience were excluded.

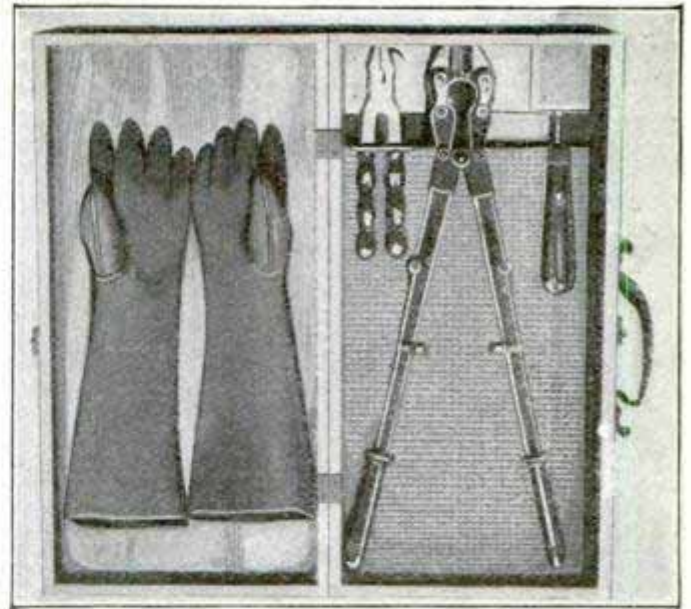
After a year of the test the medical officers concluded that the orange-red underclothing was of no material value, but that, on the contrary, it increased the burden of heat. They also concluded that the sun's rays alone are not responsible for the physiologic effects of the Philippine climate. The tests showed a higher percentage of heat exhaustion among those wearing the orange-red underclothing, exposure to the sun caused a greater temperature beneath the colored garments than beneath the white, and the wearers of the former also showed a tendency to lose weight more rapidly than the latter.

FIRE AND HEAT-PROOF JEWEL BOX

A new French fire and heat-proof case for the protection of jewels and other valuables consists of two boxes, made of asbestos, one of which is considerably smaller than the other and placed inside it. The inner box is prevented from touching the bottom, sides, or top of the outer box by a number of asbestos blocks, and the air space thus left keeps the temperature comparatively low inside the inner box even when the outer box is greatly heated.



German Collapsible Asbestos Fire Shield



Case Containing Tools for Handling High-Tension Wires

GERMAN FIRE-FIGHTING ACCESSORIES

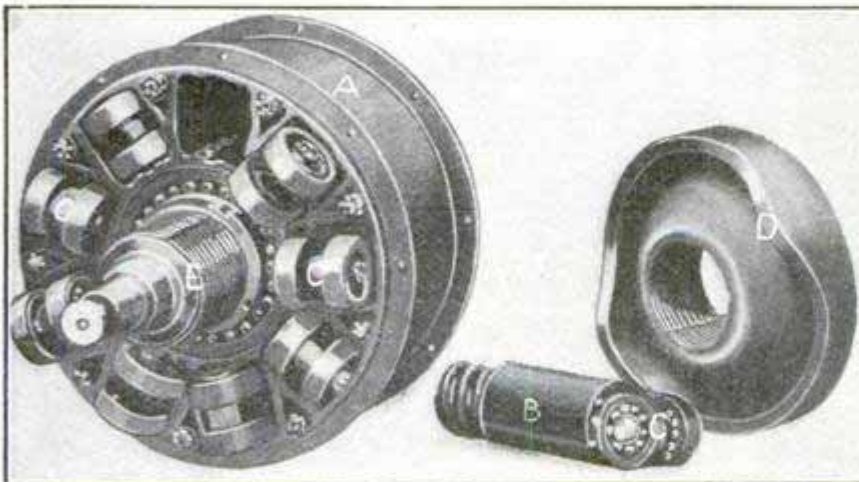
Two interesting accessories carried on the motor and horse-drawn trucks of the Berlin fire-fighting brigades are shown in these illustrations. One is a collapsible asbestos firescreen through

which the nozzle of the hose is passed. Shielded behind this screen, the nozzlemen can direct the stream from very close quarters. The other device is a case containing a pair of rubber gloves and the necessary tools for cutting and handling high-tension electric wires.

AUTOMATIC CHANGE-SPEED GEAR FOR AUTOMOBILES

A new change-speed gear for automobiles, which automatically regulates the speed of the vehicle to the tractive resistance while allowing the

practice, it will not be necessary to use a hand-operated speed-changing device, and the speed of the automobile can be lowered, as desired, by simply regulating the throttle. At other times, the automatic gear will of itself permit the automobile to run at its highest and most efficient speed, whether on the level or on up grades, and besides relieving the driver of the annoyance of changing speeds by hand, it should effect a marked economy in the consumption of gasoline.



This Device Automatically Changes the Speed of an Automobile to Correspond to the Variations of Road Resistance and Tractive Force

engine to operate with undiminished power, is described in a recent issue of Cosmos. With such a device, if the inventor's claims are borne out in

Referring to the illustration, A is a drum permanently coupled to the driving shaft. In this drum and parallel to the shaft are nine pockets each containing an axially slidable piston between one end of which and the wall

of the drum is a powerful spring. One of these pistons is shown separately at B. The other end of each piston terminates in a washer (C) which engages with the cam surface formed by the irregular edge of the rim of the part D. In the figure, this part is shown detached, but when the gear is assembled, it is screwed and keyed on the shaft E which operates the road wheels and runs free of the driving shaft with which it is lined up.

The action of the gear is as follows: When the tractive resistance is equal to the effort developed by the driving shaft, the gear acts as a solid coupling device, and the two shafts, driving and driven, turn together as one. When

the tractive resistance is greater than the driving-shaft effort, the springs between the pistons and the wall of the drum come into action and are compressed, thus allowing the washers to move around on the cam surface of the part D. The raised portions of this surface still serve to transmit the same amount of power, but, owing to the slipping, this power is transmitted at a lower rate of speed, thus automatically gearing down the driving shaft to turn the driven shaft with greater force but at a correspondingly less velocity. In this way the engine transmits all of its power without slowing down and therefore without the loss of power involved by reduced speed.

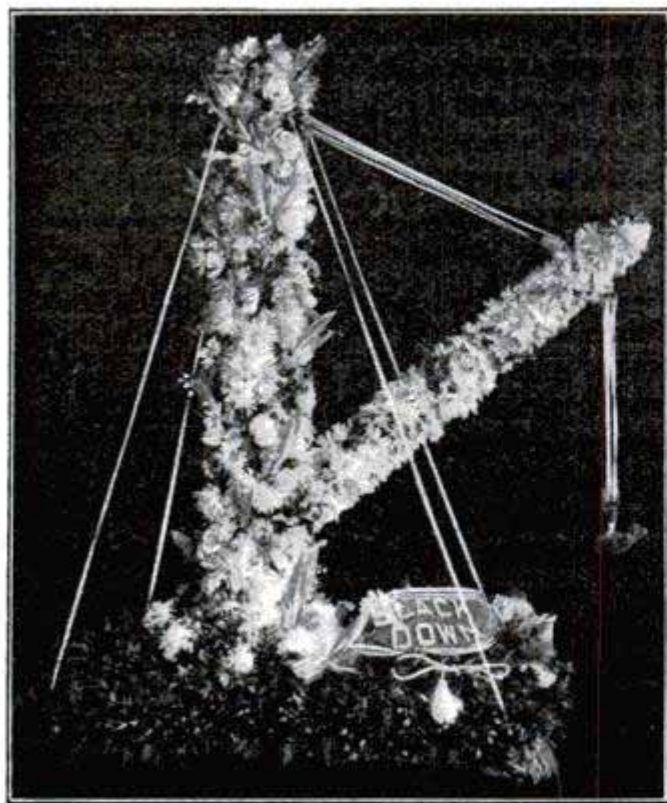
FLOWERS TELL STORY OF IRONWORKER'S DEATH

Florists throughout the country are commenting on the gresomeness of a floral design made recently in Indianapolis by a body of workmen for the funeral of one of their fellow workers who was killed while at work on a new building. The florists generally condemn the design as being entirely too vivid a reminder of the

manner in which the dead man came to his final account.

The man was a structural ironworker, and his death was caused by one of his gloves catching in the hook of a derrick just as the engine started. He called "slack down" to the engineer, but was raised 30 ft. in the air before his cries were heard, and then his hand slipped from the glove and he fell to the ground, receiving the injuries from which he died.

An organization of which he was a member ordered a floral piece for his funeral made in exact representation of the derrick and required the florist to place an empty glove in the hook, as the glove was found after the accident on the real derrick. The words "Slack Down," which the engineer had failed to hear, were worked into the base of the design.



A Gresome Floral Design for a Funeral

ANTS FIND STRANGE HOME

It is a well known fact that in the tropics ants cause considerable damage to furniture and other wooden equipment and structures, but it remained for the Connecticut Agricultural Experiment Station to learn that the insect has a fondness for loaded shotgun cartridges.

A short time ago a box of ant-eaten paper shotgun cartridges that had been returned to the manufacturer from a customer in Texas were sent to the station with a request for information as to the cause of the damage. The cardboard shells, and in some cases the wads, had been eaten so that the powder and shot fell out and mixed together.

From the appearance of the goods, some being badly eaten and others nearly perfect, it was suggested after examination that the insect had used the box of shells as a nesting-place rather than as a source of food. A similar case was reported by the station to have occurred some years ago at New Orleans, where a species called the Argentine ant, supposed to have been transported in shiploads of coffee

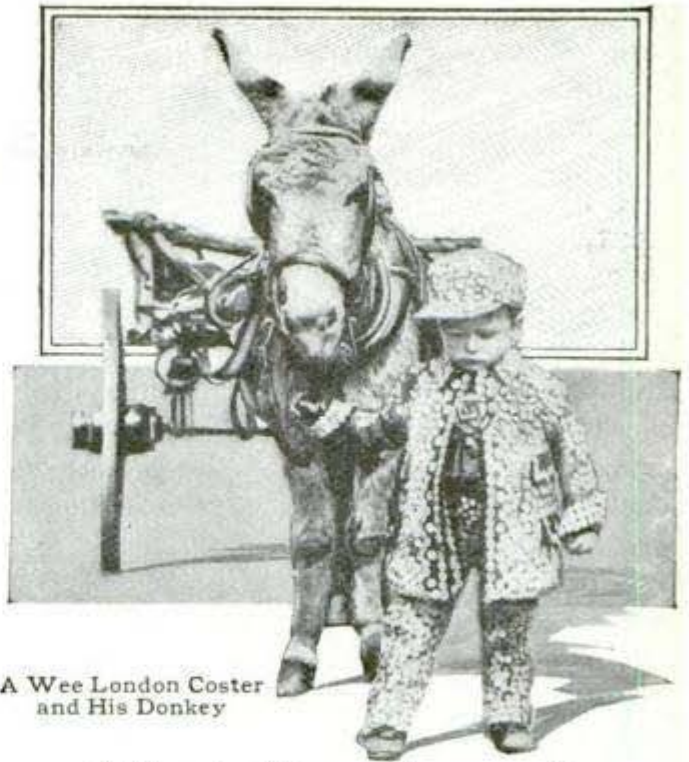


Shotgun Cartridge Used by Ants as a Home

from South America, had caused great damage to all kinds of stored food products and to other articles of commerce. It was thought probable that in some way this ant had spread from Louisiana into Texas, and was responsible for the damage to the cartridge cases.

A SMALL COSTERMONGER

The "costers" of London, hawkers of all kinds of fruits and green vegetables, have long been a joy to tourists because of their quaint turnouts and curious style of dress. The costermonger carts are always drawn by donkeys, and the dress affected is usually plentifully trimmed with huge mother-of-pearl or enamel buttons. Although many of the cockney costermongers don a more commonplace attire for everyday wear, almost all of them turn out in their regalia on holidays and special occasions, as when they go in an almost endless procession to Hamp-

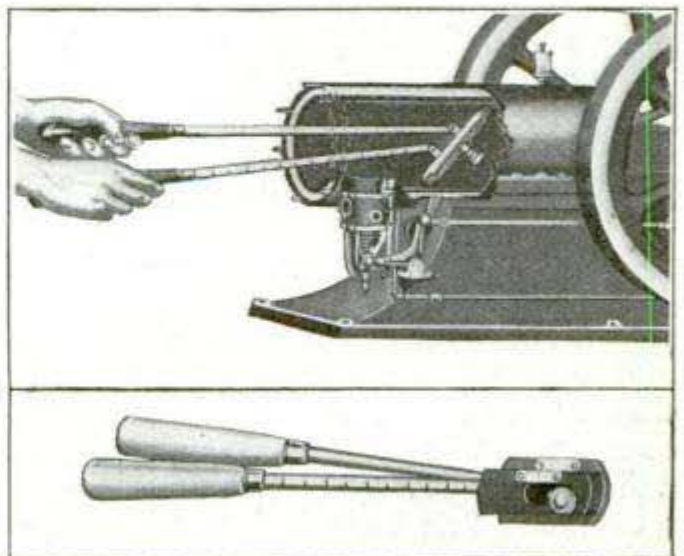


A Wee London Coster and His Donkey

stead Heath ('Appy 'Ampstead) on a Bank Holiday, or to Epsom Downs on Derby Day. The "louder" the costume the more highly prized. The costume, hat and all, of the wee coster shown in the accompanying illustration is almost solidly covered with small buttons.

MEASURING THE BORE OF AN ENGINE CYLINDER

When it is taken into account that an error of one-thousandth of an inch in measuring the bore of an average motorcycle engine cylinder may be the means of disqualifying the ma-



Measuring the Bore of a Gas-Engine Cylinder with a "Turnover" Micrometer Gauge. The Gauge is Shown Separately Below

chine in a competitive trial, it is apparent that there must be considerable refinement in making the necessary measurements of the inside of the cylinder.

A recent and most accurate instrument, especially devised for this purpose, is known as the "turnover" micrometer gauge, and is shown in use in the illustration. This is a form of the bar-type micrometer adapted for use in places that are difficult of access. The adjustment of the gauge is made by the knurled screw seen on

top, the manner of insertion being obvious. When the gauge is introduced edgewise into the cylinder, it is turned over by means of the pivoted handles until the edges of the gauge touch the cylinder walls. When the gauge can be completely turned around in the cylinder, with the exact "touch" on each side of the bore as it passes the transverse position, without forcing, the measurement is completed and can be read off on the micrometer on top of the instrument after the latter is withdrawn from the cylinder.

WALTZING DOWN A STAIRCASE

Beginning with the "Merry Widow Waltz" there have been many waltz scenes in recent light-opera productions, but all of them have been danced

search of something unique to instill new vim into dances, will probably seize upon this dance as a feature, and that at many of the balls, depending of course upon the ballroom having a grand staircase, one or two couples, more venturesome than the others, may be depended upon to try the difficult descent. Such a possibility is depicted in the illustration.



Waltz Steps and Stair Steps: Dancing the "Staircase Waltz"

on the level floor of the stage, depending upon the grace of the dancing to charm the audience. The newest Lehar opera, recently staged in London, has, like its predecessors, a famous waltz scene, but this time it is a "staircase waltz," the dancers waltzing down the grand staircase into the ballroom.

It is said that society, always in

QUESTION BENEFITS OF OZONE MACHINES

Recent researches of two French sanitation experts seem to indicate that ozone is far from being the ideal sterilizer and purifier of air it has been hitherto believed, says Cosmos, the French scientific paper. Their experiments have been especially directed toward determining the efficiency of ozone in workshops during working hours, and, while the reduction in number of microbes was manifest and perfect sterilization by its use could be obtained in 10 to 12 hours, a desirable degree of purification could not be gained unless the percentage of ozone in the air passed the limit where it begins to be noxious, if not dangerous, to the human organism.

Electric arc lighting in Paris costs more than twice as much as lighting by high-pressure gas arcs, according to figures given in a recent issue of *Journal de l'Eclairage au Gaz*.

BIRDS FLY 2,500 MILES IN A SINGLE FLIGHT

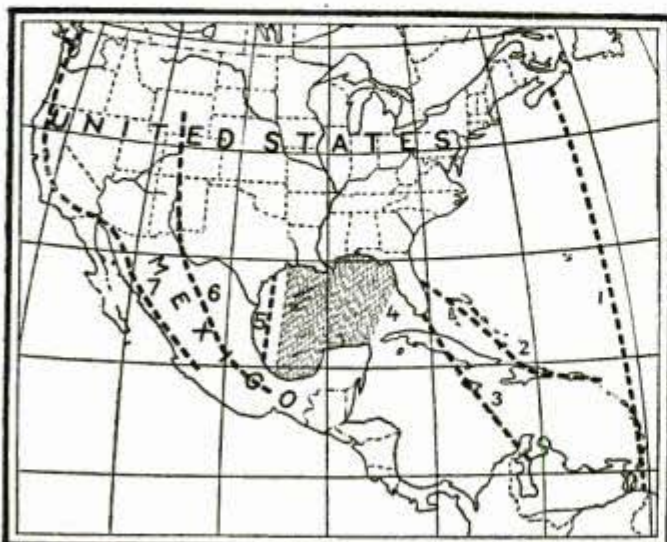
Intensely interesting data on the migration of American birds, drawing special attention to the golden plover, which makes 2,500 miles in a single flight, and to birds that fly from pole to pole to shun the darkness, are obtainable from material compiled by Wells W. Cooke, of the U. S. Biological Survey, for the National Geographic magazine.

The principal routes used by the myriads of birds in their migrations between North and South America are shown in one of the maps. The middle route is by far the most important, and may be said to extend from north-western Florida and western Louisiana across the Gulf of Mexico to the southern coast of the Gulf, and thence by land through Central America to South America. More birds probably follow this route than all the other routes combined.

Long over-water flights do not take place without many casualties, and not the smallest of the perils arises from the lighthouses. "Last night I could have filled a mail-sack with the bodies of little warblers which killed themselves striking against my light," wrote the keeper of Fowey Rocks lighthouse, in southern Florida. Every spring and fall the lights along the coast lure countless birds to destruction.



Showing the Breeding Range and Winter Home of the Arctic Tern



Principal Routes of Bird Migration from North to Central and South America

The flights of 500 and 700 miles across the Gulf of Mexico are short, however, as compared with the extraordinary 2,500-mile flight of the golden plover, which is the longest sustained flight ever recorded. These birds nest along the Arctic coast of North America, and, as soon as the young are old enough to care for themselves, fall migration is begun by a trip to the Labrador coast, where they fatten for several weeks on the abundant native fruits. A short trip across the Gulf of St. Lawrence brings them to Nova Scotia, which is the starting point for the wonderful ocean flight, due south to the coast of South America. This route is shown on the small map. If the weather is good, the birds make the entire trip without pause or rest, but,

if a tempest arises, they may be blown out of the course to the New England coast, and start anew on the advent of fair weather. Having accomplished the ocean voyage, the golden plover passes across eastern South America to its winter home in Argentina, and after a sojourn of six months there, finds its way back to the Arctic again by an entirely different and this time mostly land route.

The world's most extraordinary traveler is the Arctic tern, which migrates from pole to pole, thus shunning the darkness of night. The tern nests as far north as land has been discovered; that is, as far north as it can find anything stable on which to construct its nest. Indeed, so arctic are the conditions under which it breeds, that a nest found only $7\frac{1}{2}$ deg. (about 500 miles) from the pole contained a downy chick surrounded by a wall of newly fallen snow which had been scooped out of the nest by the parent. When the young tern is fully grown, the entire family leaves the Arctic, and some months later the birds are found skirting the edges of the Antarctic continent. What their track is over the 11,000 miles of intervening

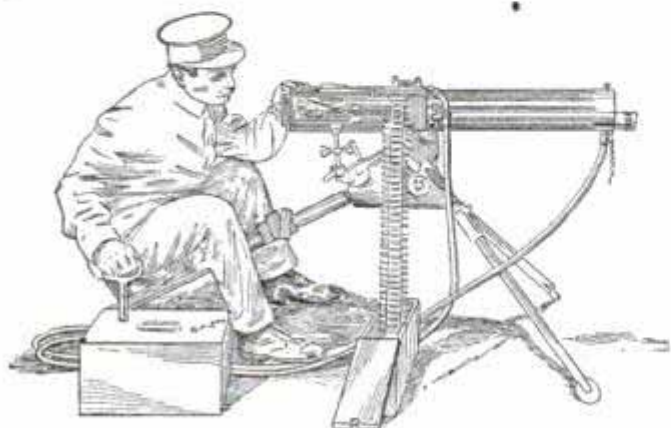
space no one knows. A few scattered birds have been seen along the United States coast south of Long Island, but the great flocks of thousands and thousands which alternate from one pole to the other have never been observed by any trained ornithologists competent to learn their preferred path and time schedule. They arrive in the far north early in June, and leave about August 25. They probably stay a few weeks longer in the winter home than in the summer home, which, if so, leaves them about 20 weeks for the round trip of 22,000 miles. But, by this migration, the Arctic terns have more hours of daylight and sunlight than any other animals on the globe. At the most northern nesting site the midnight sun has already appeared before their arrival, and it never sets during their entire stay. During two months of the stay in the Antarctic they do not see a sunset, and for the rest of the time the sun dips only a little way below the horizon and broad daylight continues all night. They have, therefore, 24 hours of daylight for at least eight months of the year, and during the other four months have considerably more daylight than darkness.

LATEST AUTOMATIC RIFLE-CALIBER GUN

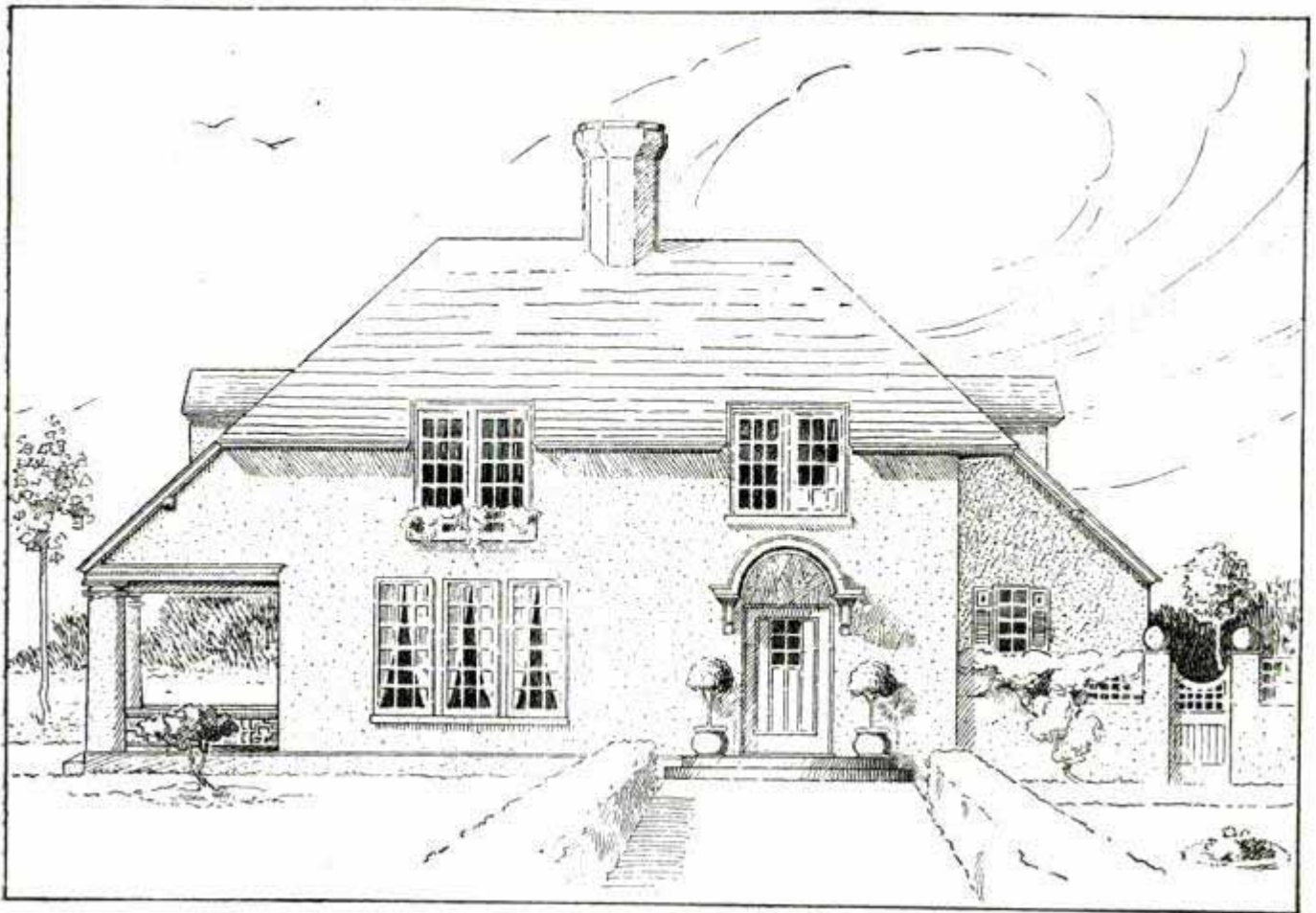
The latest type of Vickers' automatic rifle-caliber gun weighs only 27 lb. as compared with the 60 lb. of the British service automatic rifle-caliber gun, and can continue firing for much

greater periods without becoming overheated, owing to a new system of condensing the water used for cooling. The weight of the new gun, with the necessary cooling water, is only 36 lb.

In one of the trials, the gun fired 180,000 rounds, of which 30,378 rounds were from one barrel, and it was only at the end of this exceptionally severe test that there was any indication of falling off in efficiency. A rapidity series of 1,000 rounds was fired on one occasion in 3 min. 35 sec. By the introduction of the new system of condensing, the water in the jacket is continually renewed, and the effect of this circulation is to add enormously to the number of rounds which may be fired without overheating. The complete apparatus is divided among three infantrymen for transportation.

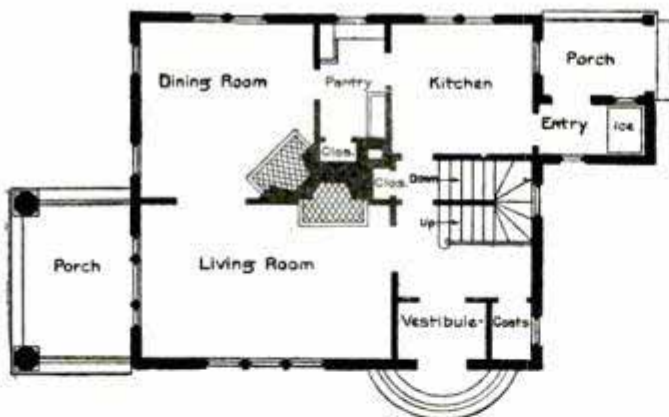


The New Automatic Rifle-Caliber Gun with Condensing Apparatus in Operation



Front Elevation of Artistic \$4,500 Concrete Cottage

Wm. J. Ryder, Architect



First-Floor Plan



Second-Floor Plan

SEVEN-ROOM COTTAGE OF SIMPLE LINES

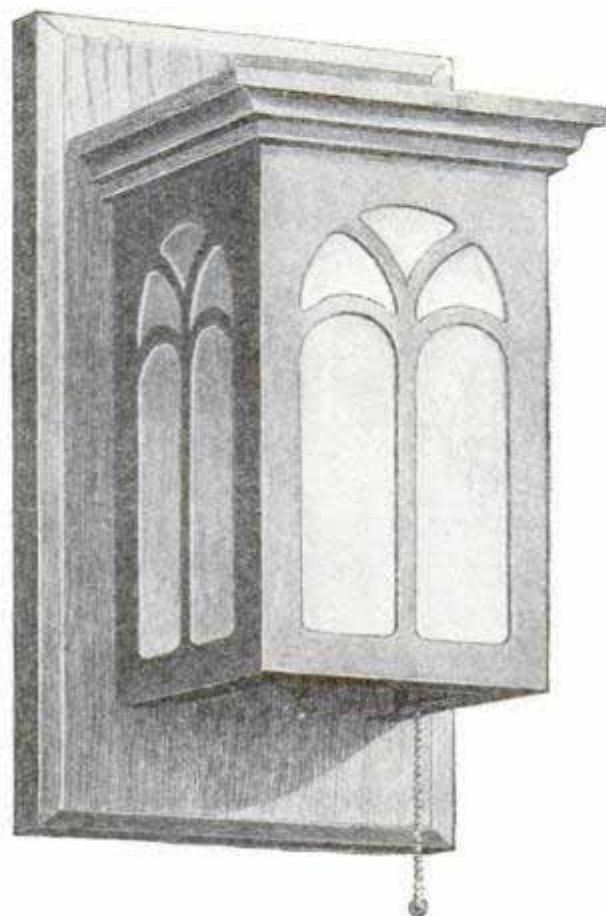
A cottage of seven rooms, constructed of concrete, on exceptionally simple lines, was among the prize-winning designs in the recent Building-Employers'-Association competition. The distinctive feature of the building is the four bedrooms of ample size provided for on the second floor. The simplicity of the plan and the skill with which every inch of the space has been utilized without marring the excellent

architectural lines distinguish this design from many of a similar type. As has been the case with several of the prize-winning houses, this too provides for one chimney. There is provision for fireplaces in the dining room and living room, and a wide side porch. The architect estimated the cost of this building at \$4,500, this estimate being based on the cost of materials and labor at the place where it was built.

THE MAKING OF ARTS-CRAFTS LAMPS

By JOHN D. ADAMS

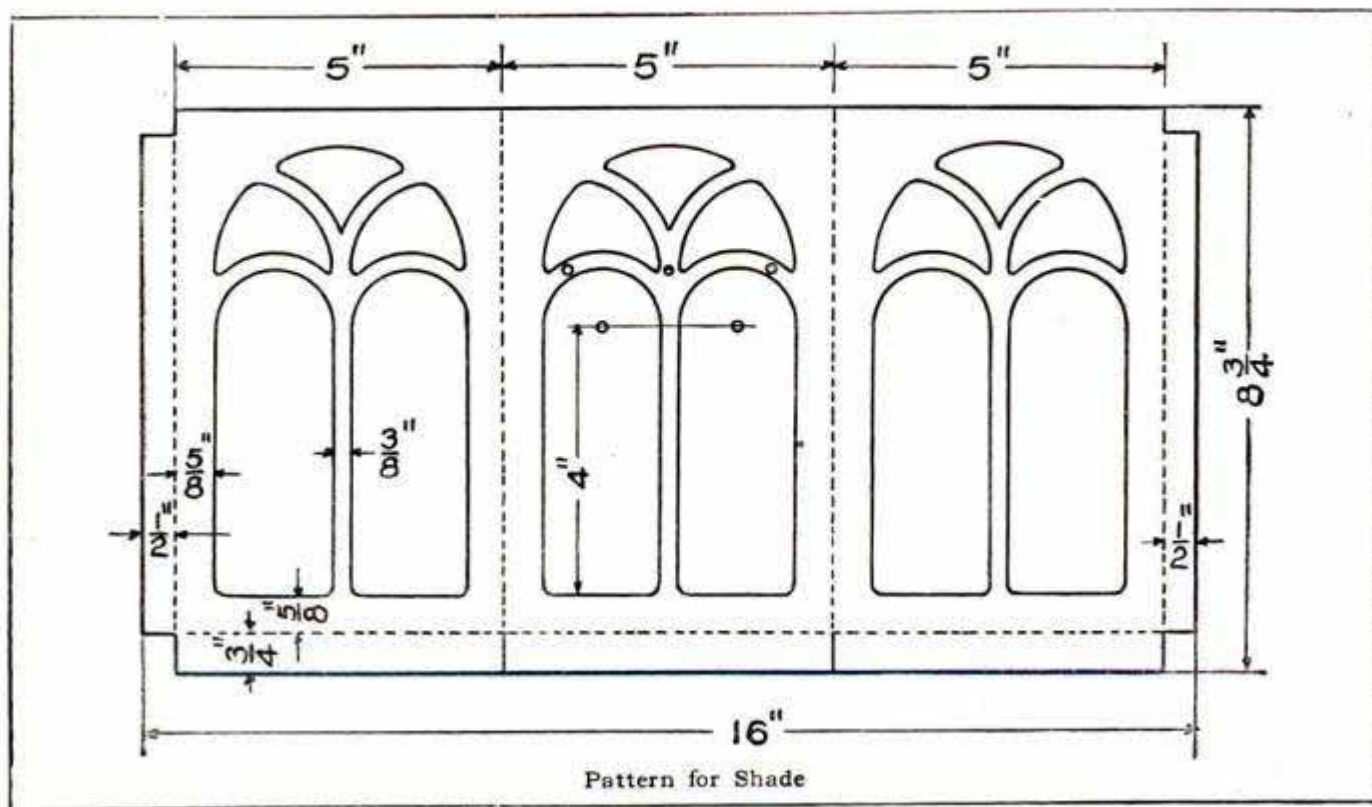
PART XIII—WALL LAMP

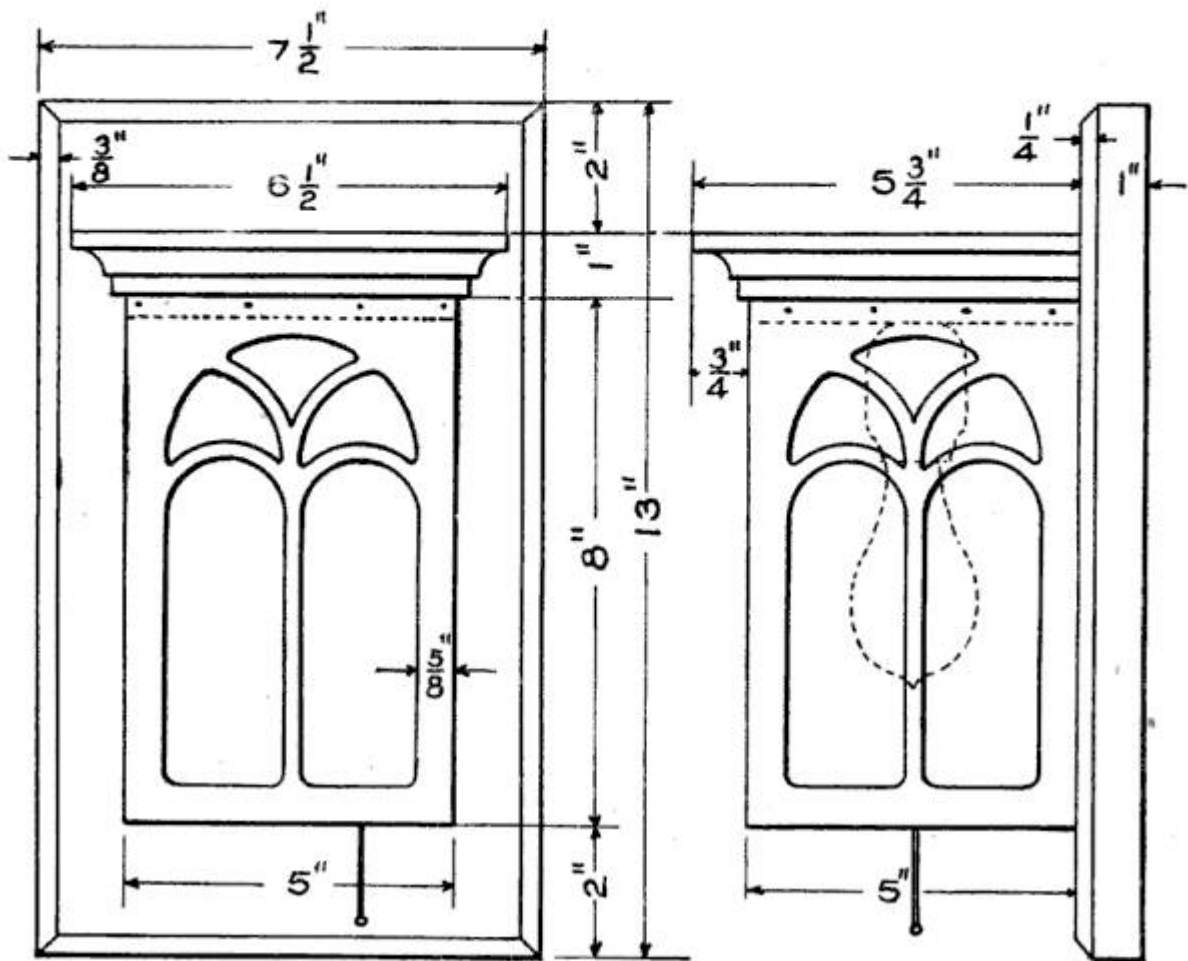


Wall Lamp Complete

THIS wall lamp can be used to advantage in almost any place such as a hall, den or porch, where a rather subdued light is desired. A wooden mantel with one of these lamps on either side is a delightful combination.

The construction, which is very simple, should start with the preparation of the back board, which requires no further treatment than that of trimming up square and beveling on all edges. The top board should be about $1\frac{3}{8}$ in. thick, with a $\frac{3}{4}$ -in. molding running around the front and two sides. This leaves a portion of the board plain, which portion extends downward into the shade, and to which the shade is attached. Should the reader be supplied with the necessary tools the entire top may, of course, be made in one piece. Secure the top to the back with glue and screws set in from behind, taking due care that the two pieces form an exact right angle. The





Details of Wall Lamp

pattern of one side should now be marked out on a piece of heavy flat paper. Cut this out with a sharp knife and then transfer it to the sheet of cardboard, on which it is to be marked off three times as shown.

All of the curves are portions of circles, the centers of which are indicated by small circles on the middle section. It will be noted that all corners are rounded out. Cut clear through along the full lines, and score with the knife along the dotted lines to a depth that will permit of a sharp bend. Bend into shape along the vertical lines, turning the strip at each end so that it will lie flat against the back board. The extra strips at the bottom should now be bent inward to a horizontal position and connected with paper fasteners at the over-lapping corners. Place the shade in position and attach to the top and back board with glue and a few

small tacks inside. Passe-partout all the bends, and then paint the entire frame a dull black. The woodwork should be stained to match the surrounding furnishings and rubbed to a dull finish with wax. Three pieces of colored paper should now be selected, and, after applying a little glue or mucilage to the inside of the frame, slipped inside. This completes our lamp with the exception of the socket, which, preferably, should be of the type operated with a small pull chain.

¶To explain the reason for increased electric bills this year, a New York electric company is distributing among its customers a chart showing graphically the greater number of gloomy days in 1911 as compared with corresponding days during the past three years.

WAY OF HOLDING CIGAR MAY SHOW CHARACTER



Loquacious, Popular,
Generous, Open-
Hearted



Thoughtful, Pen-
sive, Deliber-
ate



Interesting Talker,
Good Judge of
Mankind



Determined, Positive,
and Generally
Right



A Thinker Who Never
Leaps Until He
Looks Carefully



Exactng, Irritable, but
One Who Keeps
His Word



Jolly, Bluff, Hearty,
but Very Ob-
stinate



Skeptical, Practical,
and Resentful of
Interference



Exquisite in Dress
and Also in
Manner



Morose, Solitary, Gen-
erous when it Means
Advantage



Abrupt, Always Seeks
to Gain His Own
Ends



Economical, but Per-
haps from Sheer
Necessity

Courtesy Hotel World

Many students of human nature claim that the way a man holds his cigar, as well as the other little mannerisms incident to his habits and life, is a sure key to his character. Definitions of character based on the manner of holding a cigar are here shown.

ELECTRIC-LAMP PURSE FOR WOMEN

This very useful purse novelty, called a "luminous purse," is designed for women, who, being pocketless, have never before been provided with a practical means of carrying electric pocket lamps. The chamois-skin purse dangling from her waist is not inar-

tistic, and the simple opening of the purse and pushing of the button sends a ray of light into dark places.



EUROPE'S LARGEST MOTOR LIFEBOAT

The new steel motor lifeboat "Brandaris," built at Amsterdam for the Holland service, is said to be the largest lifeboat in Europe. A little over 53 ft. long, with a beam of 14 $\frac{3}{4}$ ft. and a depth of 7 $\frac{1}{2}$ ft., she resembles a tug more than the usual lifeboat. The boat is driven by a 76-hp. engine, and has two cabins, one for the use of persons rescued, and the other for the crew. All the most modern life-saving appliances are provided in the vessel's outfit, one specialty being a jumping sheet, which is rigged between the two masts.

HOW TO MAKE A KITCHEN CABINET

The cabinet shown is one of the most difficult pieces of furniture of those yet presented for making at home with ordinary tools. However, the home mechanic who has made some of the numerous pieces already described will be able to grasp the idea suggested by the detailed drawing and illustration, taken in conjunction with the stock list, and make a cabinet for his own kitchen without much trouble. This useful piece of furniture can be made of oak or any of the common cabinet woods, or it may be made of hard pine and finished natural with varnish. The following lists of material will be needed:

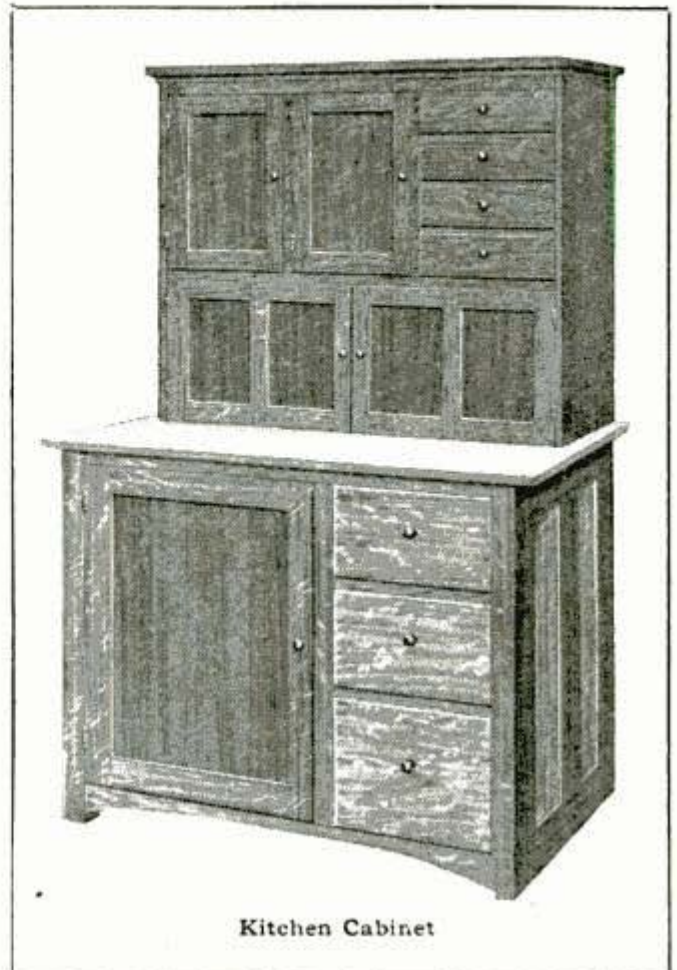
THE PEDESTAL

- 1 top, 1 by 29 by 42 in., S-2-S.
- 4 ends, $\frac{3}{4}$ by $2\frac{1}{2}$ by $32\frac{1}{2}$ in., S-4-S.
- 4 rails, $\frac{3}{4}$ by $2\frac{1}{2}$ by $24\frac{1}{2}$ in., S-4-S.
- 2 muntins, $\frac{3}{4}$ by 2 by 29 in., S-4-S.
- 4 panels, $\frac{3}{4}$ by $10\frac{1}{2}$ by 28 in., S-2-S.
- 1 facing, 1 by 2 by $29\frac{1}{2}$ in., S-4-S.
- 1 facing, 1 by $1\frac{1}{2}$ by 36 in., S-4-S.
- 2 facings, 1 by 2 by $32\frac{1}{2}$ in., S-4-S.
- 3 drawer supports and facings, 1 by 2 by 15 in., S-4-S.
- 4 drawer supports, 1 by 2 by 27 in., S-4-S.
- 2 drawer supports, 1 by 2 by 15 in., S-4-S.
- 6 drawer guides, 1 by 1 by 27 in., S-4-S.
- 1 partition, $\frac{3}{4}$ by 27 by 30 in., S-2-S.
- 1 bottom, $\frac{3}{4}$ by 27 by 38 in., S-2-S.
- 1 lower facing, 1 by 2 by 36 in., S-2-S.
- 1 door rail, 1 by $2\frac{1}{2}$ by $16\frac{1}{2}$ in., S-4-S.
- 1 door rail, 1 by 3 by $16\frac{1}{2}$ in., S-4-S.
- 2 stiles, 1 by $2\frac{1}{2}$ by 27 in., S-4-S.
- 1 panel, $\frac{3}{4}$ by $14\frac{1}{4}$ by $23\frac{1}{2}$ in., S-4-S.

All the material for the drawers are surfaced on two sides. The paneling and the door should be made first, then the framework may be set up and the drawers made from the material as follows:

- 2 fronts, $\frac{3}{4}$ by $8\frac{3}{4}$ by $13\frac{1}{2}$ in.
- 1 front, $\frac{3}{4}$ by $10\frac{1}{2}$ by $13\frac{1}{2}$ in.
- 4 sides, $\frac{3}{4}$ by $8\frac{3}{4}$ by 26 in.
- 1 side, $\frac{3}{4}$ by $10\frac{1}{2}$ by 26 in.
- 3 bottoms, $\frac{3}{4}$ by 26 by 13 in.
- 2 backs, $\frac{3}{4}$ by 8 by 13 in.
- 1 back, $\frac{3}{4}$ by $10\frac{1}{2}$ by 13 in.

The cabinet consists of two parts and the builder can carry the work along on both of them at once or make the pedestal first and then finish the cupboard and attach it on the pedestal. The work on the cupboard is taken up the same as the pedestal by finishing the paneling and doors first, then setting up the framework and lastly making the drawers. The material list for the cupboard is as follows:



Kitchen Cabinet

- 1 top, 1 by 14 by 42 in., S-2-S.
- 2 ends, 1 by $12\frac{1}{2}$ by $34\frac{1}{2}$ in., S-2-S.
- 1 facing, 1 by $2\frac{1}{2}$ by 38 in., S-2-S.
- 6 ft. of $\frac{3}{4}$ by $\frac{1}{4}$ -in. cove mold.

DOORS FOR THE LOWER PART

- 4 stiles, 1 by $1\frac{1}{2}$ by 14 in., S-4-S.
- 2 rails, 1 by $1\frac{1}{2}$ by $17\frac{1}{2}$ in., S-4-S.
- 2 rails, 1 by 2 by $17\frac{1}{2}$ in., S-4-S.
- 2 muntins, 1 by $1\frac{1}{2}$ by $11\frac{1}{2}$ in., S-4-S.
- 4 panels, $\frac{3}{4}$ by $7\frac{1}{2}$ by 11 in., S-2-S.

DOORS FOR THE UPPER PART

- 4 stiles, 1 by $1\frac{1}{2}$ by 18 in., S-4-S.
- 2 rails, 1 by $1\frac{1}{2}$ by 10 in., S-4-S.
- 2 rails, 1 by 2 by 10 in., S-4-S.
- 2 panels, $\frac{3}{4}$ by $8\frac{3}{4}$ by $16\frac{1}{4}$ in., S-2-S.

DRAWERS

All material for the drawers are surfaced on four sides.

- 4 fronts, $\frac{3}{4}$ by 4 by 12 in.
- 8 sides, $\frac{3}{4}$ by 4 by 12 in.
- 4 backs, $\frac{3}{4}$ by $3\frac{3}{4}$ by 12 in.
- 4 bottoms, $\frac{3}{4}$ by 11 by $11\frac{1}{2}$ in.
- 3 supports, $\frac{1}{4}$ by 2 by 12 in.
- 6 slides, $\frac{1}{2}$ by $\frac{3}{4}$ by 12 in.

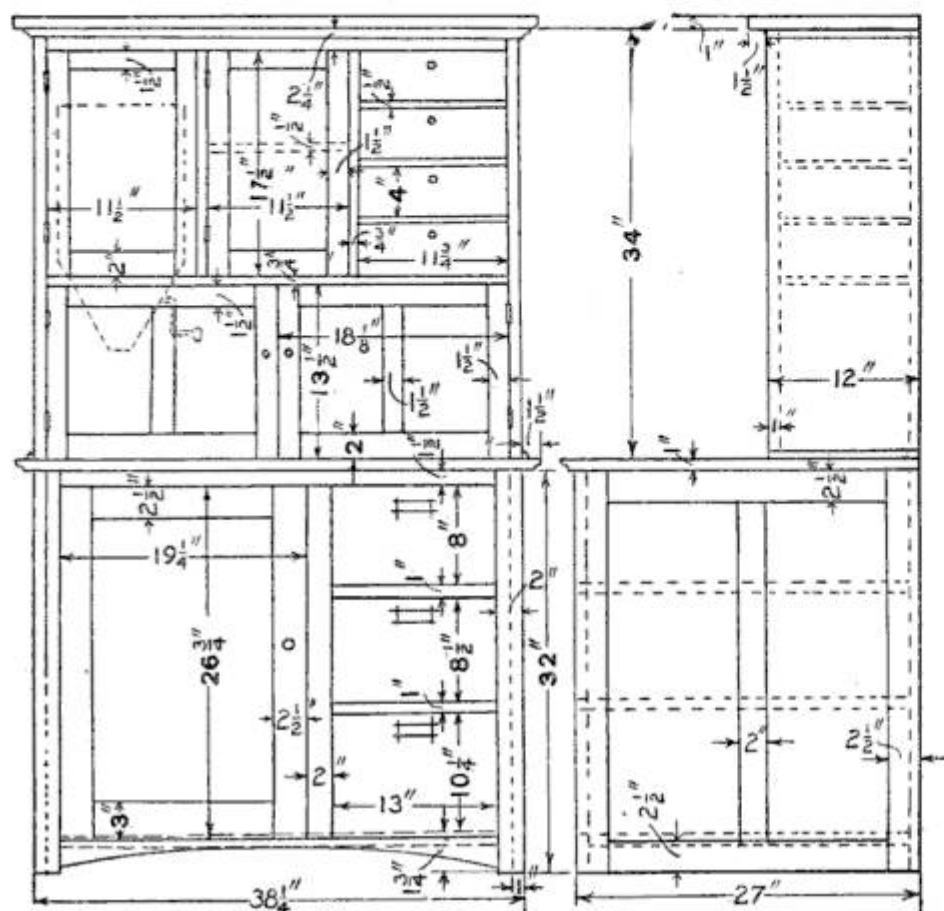
PARTITIONS

- 2 pieces, $\frac{3}{4}$ by 12 by 21 in., S-2-S.
- 1 shelf, $\frac{3}{4}$ by 12 by 37 in., S-2-S.
- 1 shelf, $\frac{3}{4}$ by 12 by 12 in., S-2-S.

Backing for pedestal and cupboard 21 ft. of $\frac{5}{8}$ -in. matched and beaded ceiling.

While not all the conveniences are indicated, the builder will be able to devise them. For illustration, on the

back of one of the doors may be made a rack to hold spice cans. On the back of another may be placed a sugar receptacle, preferably made of metal.



Details of the Kitchen Cabinet

One of the large drawers may be lined with metal, made airtight, for holding bread or cake, or with a partition both may be kept separate.

The flour bin will need to be constructed by a tinner and should be made so that it can be easily placed and removed. The top of the table might be covered with a sheet of aluminum to make it perfectly sanitary.

WILL SELL ELECTRICITY INSTEAD OF COAL

Instead of selling all its coal directly to power users, a great coal-mining concern of Pennsylvania is planning to save the cost of handling and hauling a great part of the fuel by turning its bottled-up energy into electricity at the mines, and distributing the electric power over high-voltage transmission lines to industries in surrounding ter-

ritory within an ultimate radius of 100 miles or more. To carry out this plan the company proposes to expend \$3,000,000 in the immediate future, and \$10,000,000 in all.

The initial plans call for a power plant having three electric generators of 13,400-hp. capacity each. Finally, a total of 134,000 hp. in electrical energy will be available. According to the amount of power sold to individual users and the kind of service for which it will be required, the retail price of current will be from 0.8 to 2.5 cents per kilowatt-hour, or 0.6 to 1.865 cents per horsepower-hour; that is, it will cost from 0.6 to 1.865 cents to operate a 1-hp. machine for one hour by electricity. A hydroelectric plant may also be built to operate

in conjunction with the steam plant.

Not having to transport the coal, the power stations will be able to use yearly about 500,000 tons of coal that is now unsalable.

The company's scheme is by no means visionary. An English concern already has a bigger one of the same kind in working order, and sells power to electric railways, shipyards and factories in the northeast of England. Indeed, several prominent engineers have freely predicted that eventually all power, except that derived from hydroelectric or other natural sources, will be generated in this way, by great electric stations situated at the mouths of the coal mines, and distributed to all parts of the country where light, heat and power are required.

Disappearing landing wheels, which fold up within the chassis, are a feature of a recent type of biplane.

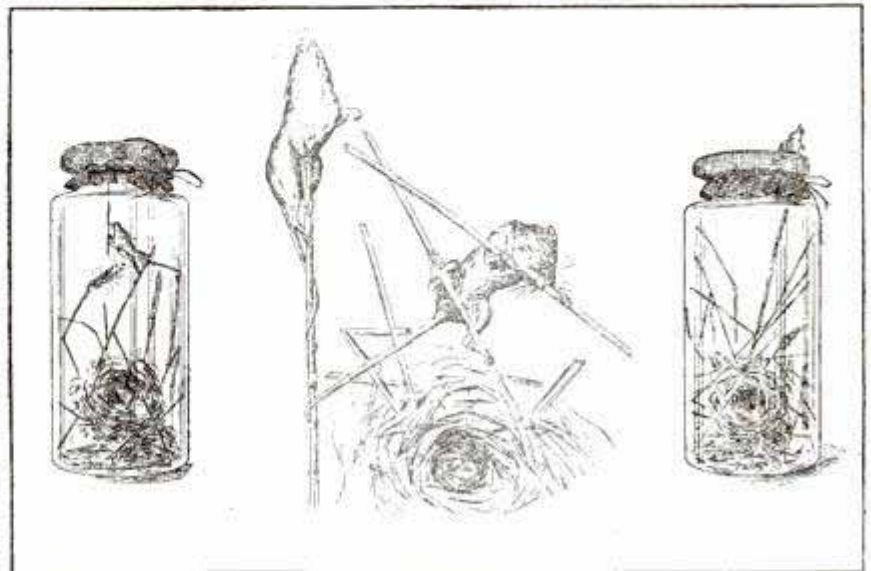
MOUSE ESCAPES CAPTIVITY BY CLEVER RUSE

In animals as in man, captivity fosters an ardent desire for lost liberty, and, placed under unusual conditions, which nature had not foreseen, the former have been known to develop surprising logic and unsuspected cunning. Such a case is here illustrated:

Confined in a large glass jar, closed at the top with a piece of gauze tied with a string, this mouse was provided with a quantity of hay and straw, out of which it soon built the customary round nest, and seemed at first to accept with patience the changed mode of existence. But one day a visitor pushed an end of the string through the gauze, and,

like a flash, the mouse ran up a straw leaning against the inside of the jar, caught the string, climbed to the gauze, and instantly started gnawing it. A light blow caused the mouse to tumble to the bottom, but from this moment, having caught a glimpse of liberty, its behavior changed. It became restless, and would climb to the very top of the straws, searching for the string, and then turned sulky. To distract it, some heads of wheat with long straws were placed in the jar, and for a time it seemed to forget captivity in the pleasure of gluttony. To cut the heads, to carry them with droll or graceful attitudes all around the jar, and to pick out and gnaw the grains seemed to be the only thought of the captive, but this was far from the fact. One day it commenced climbing up one straw with another in its teeth and dropping it. This performance was repeated again and again, but the watchers did not suspect the purpose. The mouse continued practicing, however, and more often than at the first attempts, the straw fell vertically, until at last it fell in such

position that its lower end rested on the highest side of the nest, and the upper against the neck of the jar. Then, all excitement, it threw itself headlong to the bottom of the jar and



First Glimpse
of Liberty

Preparing the
Escape

How it Was
Accomplished

ran up and down the straws incessantly, exhibiting the most extraordinary poses and remarkable acrobatic feats.

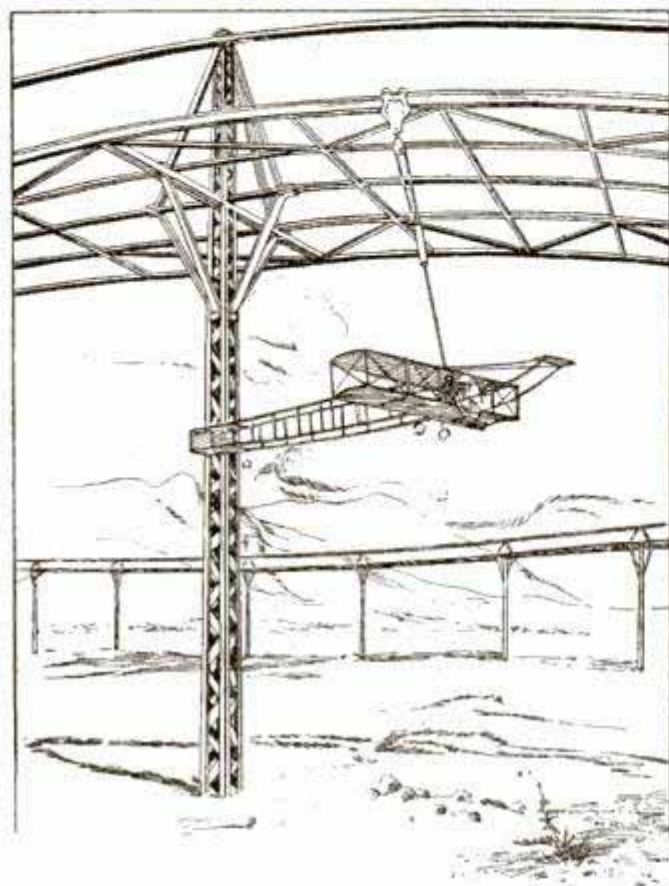
"Even then," said one of the captors of the mouse, "the truth did not dawn upon us—we confess it with all humility. We watched the antics of our little captive a hundred times during the day, and gave it much good advice, which, with very good reason, it did not accept. For the next morning it had disappeared, leaving a telltale hole in the gauze."

Future North Pole seekers will be interested in the announcement that the Norwegian government will establish a "farthest-north" wireless station in Spitzbergen, for the benefit of Arctic explorers.

Ozonizing apparatus will shortly be installed at each station of the "Two-penny Tube," one of London's subways, capable of supplying the adjoining section of the tube with 8,000,000 cu. ft. of purified air a day.

AIRMEN MAY BE TAUGHT BY AERIAL TRACK

A company has been formed in Berlin to construct a unique aerial way for the safe operation of the machines



Unique Aerial Structure Designed for the Teaching of Student Airmen

of student airmen. The plans call for a track or trolley-way erected on standards 60 ft. high. There are to be two tracks, the outer one about 35 ft. from the standards, and the inner one about 45 ft., and from these the aeroplanes will be suspended by wire cable.

HOW ENGLISH MOTORISTS ESCAPE "TRAPS"

To circumvent the speed laws on English roads a unique organization has been formed. Thousands of owners pay fees which are used to maintain a corps of men, who are stationed on the principal roads, warning drivers when they are approaching speed traps where police are watching, and, on the other end of the trap, notifying the driver that the road is clear and free from police.

PRISONER MAKES CURIOUS SCALING HOOK

The attempted escape from the Baltimore city jail of Hume L. West, a prisoner charged with forgery, although unsuccessful, is interesting because of the means utilized by him in the attempt. West engaged a confederate to smuggle in to him sections of pipe, each section being 8 in. long, $\frac{3}{16}$ -in. in diameter, and threaded at both ends. Besides these sections, of which there were 12, West received the required number of sleeves, each one threaded to fit the sections. All this material he secreted under his bed while rounding out his plans, cutting through a bar in the window with a small saw, and tearing up heavy cotton sheets to form two ropes.

On the night of the attempted escape he joined the sections of pipe together, thus forming a large scaling hook, tied one of the ropes to its end, finished sawing through the bar, and slid down the other rope into the yard.

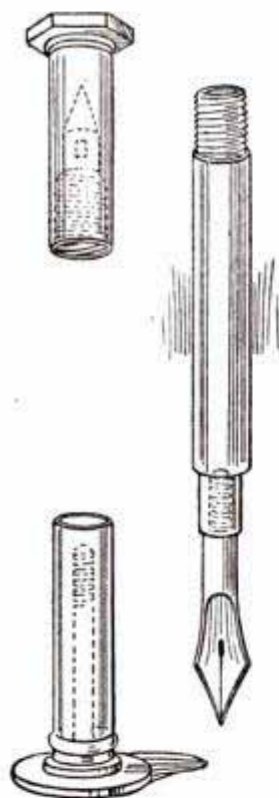


Attempting to Escape with Ingenious Scaling Hook

Then he went to the outer wall and threw up his hook. It caught on the top and he commenced the ascent, but ill luck overtook him, the hook broke, and he dropped back into the yard again. In desperation he then attempted to climb the wall without aid, but just as he was reaching for the top, his feet slipped and he fell again, this time badly wrenching his ankle. He then hobbled into the prison and gave himself up.

FOUNTAIN PEN MADE 200 YEARS AGO

This illustration of an "everlasting" pen was found with description in a manuscript dated 1725 and signed by Sieur Bion, "purveyor to the king and maker of mathematical instruments," Paris.



Like the modern fountain pen, it was made with three principal pieces. The central section contained the ink, which flowed to the pen through a perforation. The lower cap had a threaded rod in its center, which closed the perforation in the ink container when screwed into place.

The upper end of the ink container was closed by a threaded cap provided with a lead-pencil point covered by still another cap.

MINERS' ELECTRIC LAMP

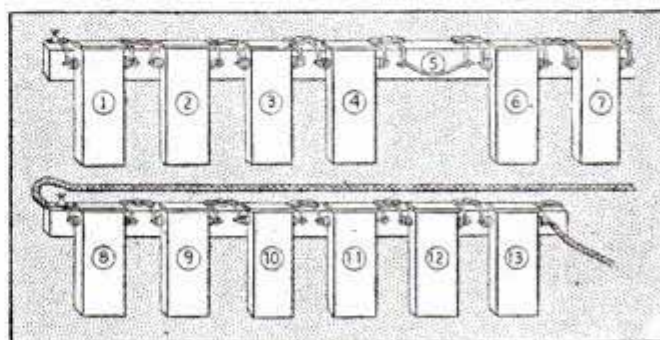
An electric lamp and battery for miners, the weight of which is only $2\frac{3}{4}$ lb. complete, is shown in the accompanying illustrations, along with the unique arrangement for charging the batteries. The battery is small



Miner Equipped with Electric Lamp and Battery

enough to be easily carried in the hip pocket, and is formed of an outer steel casing cemented to an inner casing of hard rubber, so that it is practically impossible to smash. If the rubber cell should be cracked, the cement used prevents the acid from acting on the steel casing.

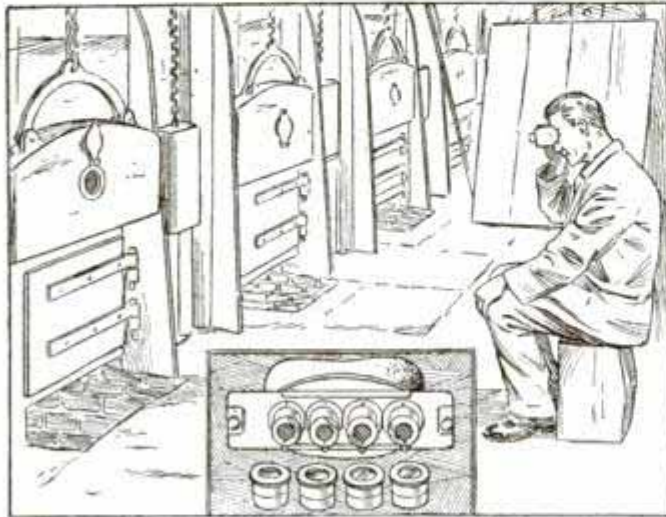
The lamp will maintain a bright light for 14 or 15 hours, and the battery is recharged each day by means of a unique charging rack. Each battery bears a number corresponding to its number on the charging rack, and, on leaving work, each miner places his battery in its proper charging place. The electric current is left on the charging rack at all times, so that the battery may be charged whenever hung up. The batteries and the rack arrangement are also being utilized in place of the checks ordinarily used to check workers as they go in and out of the mine.



The Rack Arrangement for Charging the Batteries

ASCERTAINING TEMPERATURE WITH STEREO-PYROMETER

One of the latest instruments for ascertaining the temperature of crucible furnaces, gas retorts, pottery kilns,



Measuring Temperature with New Type of Pyrometer

glass furnaces, etc., is a stereo-pyrometer, the advantage of which is claimed to be in the fact that its stereoscopic form allows both eyes to be used for the observations, instead of only one.

The stereo-pyrometer consists of small glass cells containing dyes, the absorptive powers of which are so chosen that all the light of whatever color emitted by a hot body is absorbed. No accessories are required, as in the case of electrical pyrometers and the radiation pyrometer, and it can be used at any convenient distance from the hot object, as long as the intervening space is comparatively free from smoke.

USING THE SUN'S HEAT IN CHEMICAL EXPERIMENTS

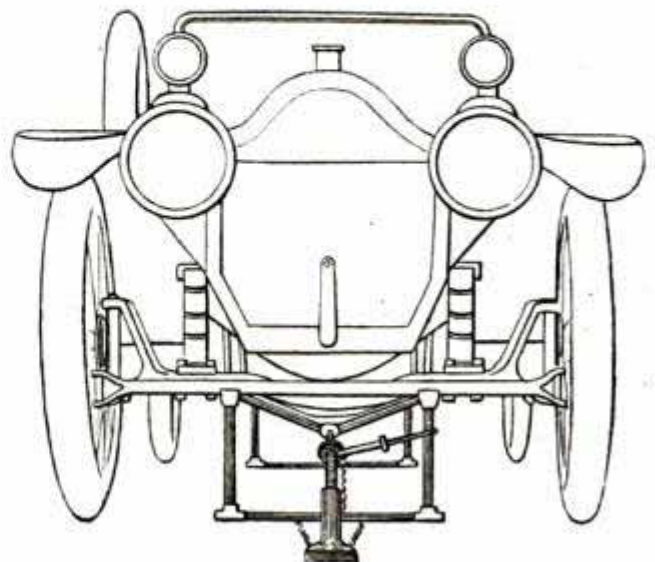
Ordinarily, in melting substances which become liquid only at a high temperature, the containing vessel or furnace must be made largely of a material which has high heat-resisting properties. Recently, a German chemist has discovered that if the substance to be melted is placed within a glass vessel from which the air has been exhausted, and the sun's rays focused on

it, the vessel itself does not have to be made of highly refractory (heat-resisting) material.

The apparatus used consisted of an exhausted glass vessel in which was placed a magnesia crucible containing the substance to be melted. The sun's rays were focused by means of a simple lens, flat on one face and convex on the other, of about 16-in. diameter and 20-in. focal length. Pieces of copper and cast iron were melted almost instantly, while crystallized silicon, which melts at about 2,640 deg. F., became fluid in a few seconds. A much less temperature was obtained when the substance was taken out of the vacuum and heated in air by the same method.

AUTOMOBILE JACK LIFTS THE ENTIRE CAR

An automobile jack, designed to lift all four wheels at once, is now on the market. The jack comprises two frames, constructed of steel uprights and held rigid by heavy steel cross bars, and having bases connected by several feet of chain. The frames are tilted at an angle under the front and rear axles, and the differential screw pushes the car backward a few inches, thus bringing the frames into a vertical position and elevating both front and rear axles at the same time.



With this Automobile Jack All Four Wheels of the Car can be Lifted at the Same Time

CHURCH STEEPLE RAISED AND MOVED 30 YARDS

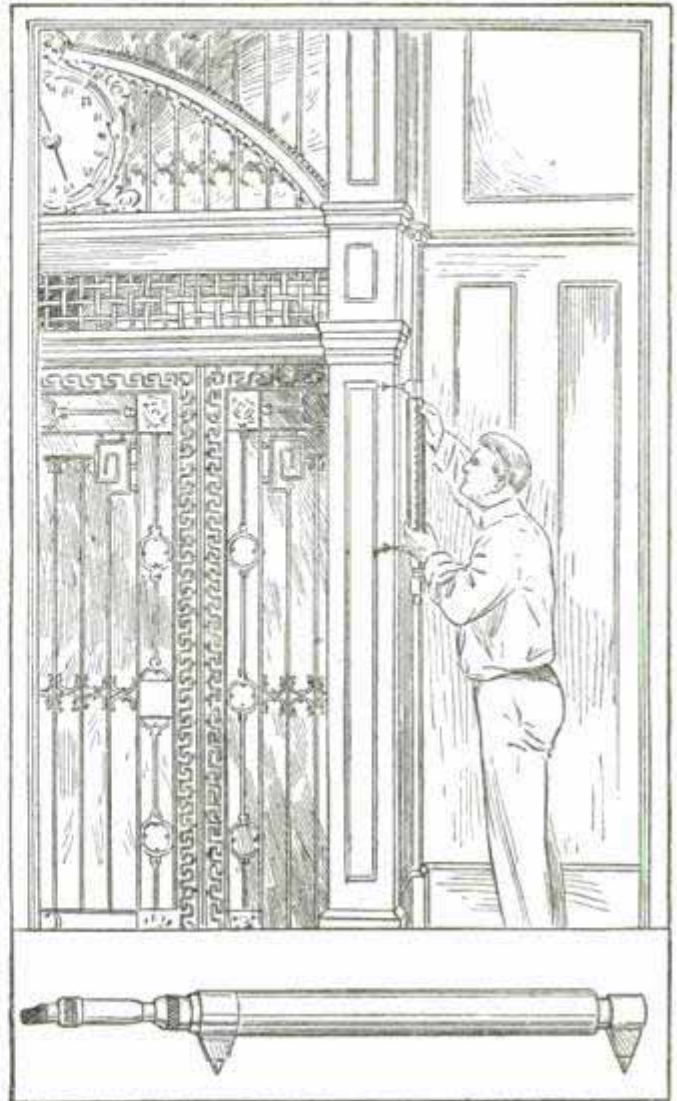
A difficult feat in moving a building was recently accomplished in Holland when the steeple of a church near Limburg was lifted bodily, transported a distance of 30 yd., and lowered on to its new foundations. A special substructure of wooden beams, iron girders, and concrete was built under the steeple, and steel rollers, 2 in. in diameter and 5 in. apart, were placed underneath. A runway of steel rails based on a grid of longitudinal and transverse girders was provided for the rollers. The longitudinal girders rested on jacks by which the whole structure was raised 0.8 in. Eight windlasses were used to pull the steeple to its new site. A movement of 4 in. only was attempted on the first day, which was finally increased to 60 in. per day. On arriving at the new foundations, the steeple was lowered again and made secure without further difficulty.

KEEPING A CHECK ON THE STABILITY OF STRUCTURES

A simple, cheap, yet withal highly sensitive method of measuring the deforming effect of loads on the members of a structure, with a view to comparing the condition of a building at any time with its original condition at the time of erection, has been developed by the Bureau of Standards, at Washington, D. C.

This is done by means of a device called a strain-gauge, which is a kind of micrometer caliper for measuring correct to the ten-thousandth of an inch the distance between two gauge marks set not over 10 in. (in the small size) or 20 in. (in the large size) apart, the larger gauge thus giving a sensibility of 1 in 200,000.

The gauge marks are made in pairs on any number of accessible structural members in a building, and their distance apart is measured at stated intervals. An increase in this distance

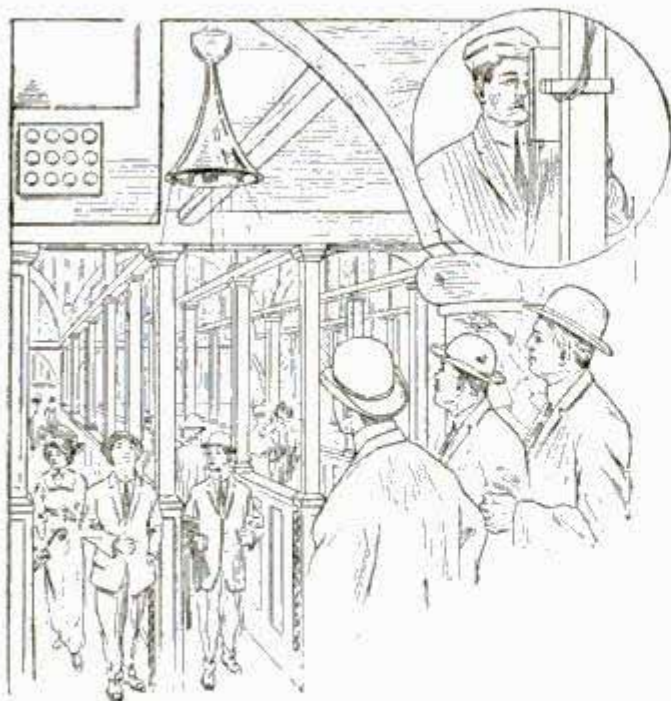


Testing Deformation on Vertical Girder of Elevator Shaft in Office Building. The Strain-Gauge Used in This Test is Shown Below

indicates that the member is being stretched as time goes on, and a decrease shows compression. An engineer can then readily compute from the readings the extra stress in pounds per square inch that is being put on important members by changes in the conformation of the building due to settling of the foundations or the like, and in this way any possible dangerous condition is immediately indicated.

MEGAPHONE-TELEPHONES ANNOUNCE CARS

An ingenious system of megaphone-telephones is being used at the Blackfriars station of the London tramway to accelerate the movement of outgoing passengers. The new station, which is of the queue or lane type, is 225 ft.



Announcing Destination and Vacancies of Cars by Telephone Megaphone

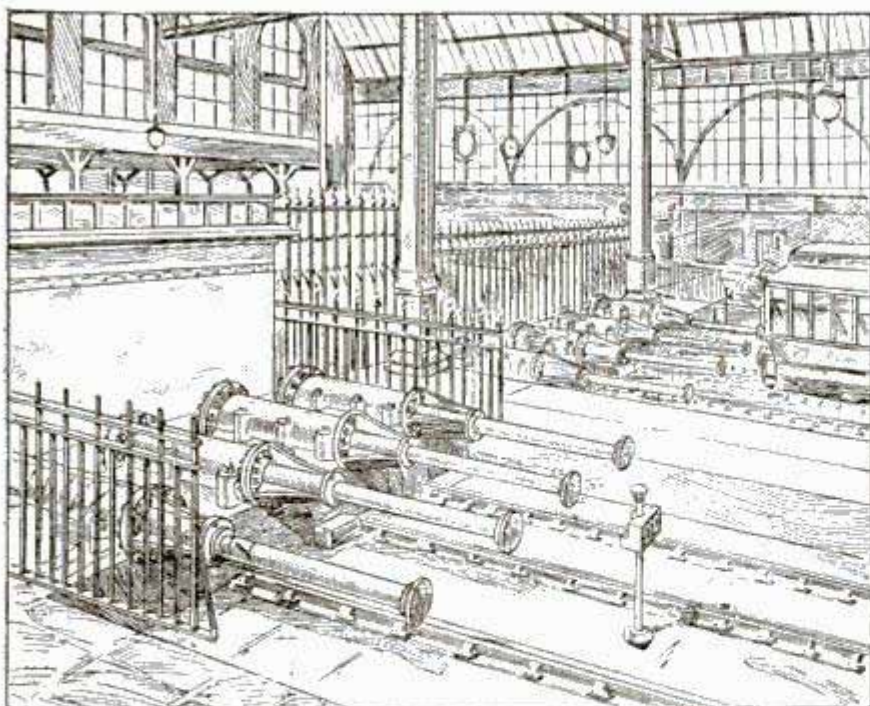
long, and has three lanes, each of which is just wide enough for a single line of waiting passengers. A megaphone is fixed in the roof above the entrances to the loading platforms, and by means of this, a guard, located about 500 ft. distant, telephones the destination of the approaching cars and their capacity. "Clapham, 68 vacancies," says the megaphone, for instance, and the inspector in charge of the queues counts out 68 passengers from the line formed to take this branch of the tramway service, and fixes the chain against the rest, who have to wait for the next Clapham car announced.

The telephone itself has its reproducing power intensified by special devices, and this is still again magnified by the megaphone trumpet overhead.

HYDRAULIC BUFFERS FOR RAILROAD TERMINALS

The number of collisions between running trains and platform dead ends at terminal stations in England has resulted in the utilization of hydraulic

buffers in the London terminal passenger station of the London & Southwestern Railway is shown in the illustration.



Hydraulic Buffer Stops of 7-Ft. Stroke in the Terminal Station of the London & Southwestern Railway

buffer stops as a means of preventing damage to rolling stock and possible fatal injuries to passengers and train crews. The installation of hydraulic

movement. As the speed is checked and the stroke of the pistons made, smaller passages for the water are provided, with the result that a constant

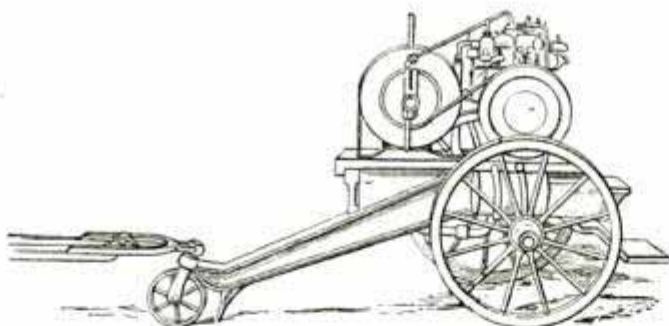
The operation of the buffers is simple. A pair of cast-iron cylinders is mounted upon simple concrete foundations in line with the buffers of the rolling stock, and from them piston rods carrying buffer heads on the outer ends project to a distance of 7 ft. The cylinders are completely filled with water, which passes through channels from behind the pistons to the front as they are forced home. The arrangement of the water passages is such that when the pistons are first forced back a pressure is set up behind them opposing the

resistance is afforded and the train brought to a standstill without shock or recoil. The water displaced when the piston rods are forced home leaves the cylinders at the forward ends through relief valves.

The buffers are automatically reset by means of a constant supply of water connected up to the front part of the cylinders at a pressure of about 35 lb. per square inch. This pressure, acting on the piston rods, immediately forces them out again as soon as the train backs away.

WARLIKE IMPLEMENT OF PEACE

At the recent agricultural exposition in Tunis, Africa, the makers of the Gnome motor for aeroplanes exhibited a 6-hp. motor designed for use on the farm, which, while not presenting any novel features of motor construction, attracted much attention on account of



Gas Engine Mounted on Carriage for Farm Work

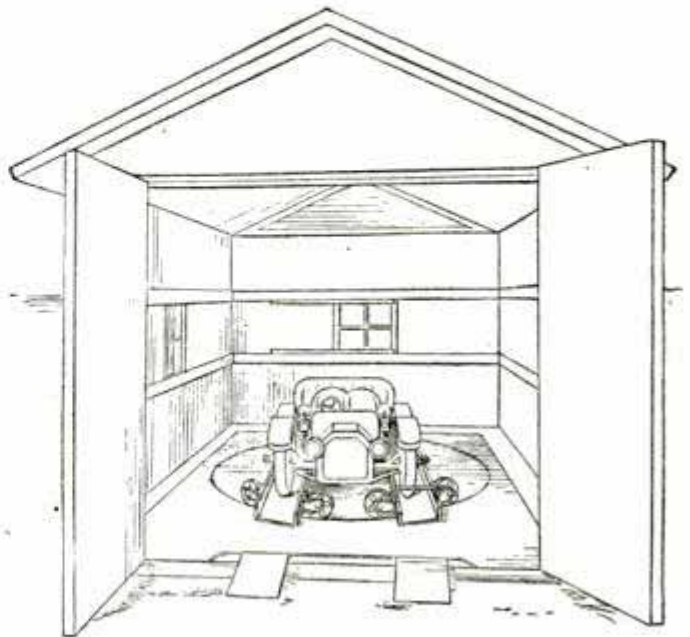
its unique mounting which closely resembles a gun carriage. The large wheels of this carriage make it easily managed even on rough ground, and two men can transport it from place to place. The motor is made for gasoline or oil consumption.

PITLESS TURNABLES FOR AUTOMOBILES

An automobile turntable, requiring no pit, excavation, or any alteration of the floor, is being manufactured in Kansas City. The runways upon which the car wheels are carried, are steel, 15 in. wide, with a 3-in. flange on each

side, and bend downward at the ends to allow the car to be easily run upon them.

The framework of the turntable is a



Portable Automobile Turntable of a Type which Requires No Pit, Excavation, or Alteration in the Floor

skeleton steel work carried on eight casters, which run on a light steel track. In the center of the turntable is a king pin, from which radiate six stay rods, designed to maintain the circular track in position. These stay rods eliminate the necessity of any floor fastening, nor does the center plate carrying the king pin rest on the floor. Instead, it is supported by a combination thrust ball bearing.

NEW PRINCIPLE IN REVOLVING DOORS

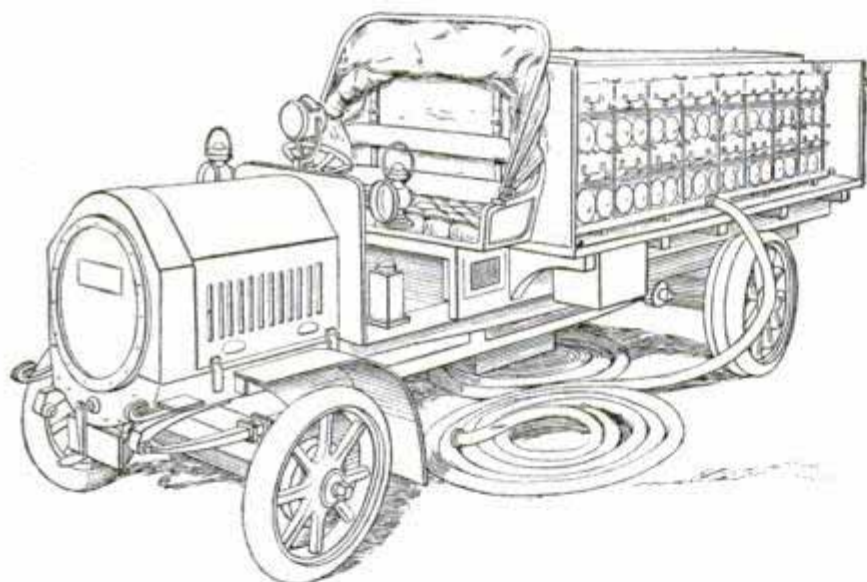
A British firm of constructors has designed a revolving door for the entrances of public buildings, banks, hotels, etc., on an entirely new principle. Instead of being in the form of wings, which are pushed around in front of the person entering or leaving the building, it is in the form of a cylinder, which revolves around the



person. When the open section of the revolving cylinder faces out, the person enters and stands in the middle for a moment, then passes onward into the building when the opening in the revolving cylinder faces in.

AUTOMOBILE TRANSPORTS BALLOON GAS

A concern in Germany has constructed a special automobile for the transporting of hydrogen gas to airships during maneuvers, or in case of an unforeseen landing. The chassis is of the type adopted by the German army, and the body is constructed to accommodate 80 hydrogen bottles, each of which has a capacity of 177 cu. ft.



An Automobile Especially Built to Supply Airships with Hydrogen Gas

They are arranged in four layers with the tube connections alternating on the right and left-hand sides of the car.

The car is driven by a 45-hp. 4-cylinder motor.

NEW METAL-PERFORATING PROCESS

A process for perforating a piece of metal with slots narrower in width than the thickness of the metal, a feat hitherto regarded as impossible by ordinary practical methods, has been perfected by a California inventor. The principle is simple. The metal is cracked along a series of parallel lines

by a process similar to the action of a pair of shears in cutting. The solid metal between the cracks is then rolled, and this stretches the metal and widens the cracks to the width of slot desired.

Metal perforated in this way has many uses, among which may be mentioned casings for wells, and perforated pipes for subsoil drainage or irrigation.

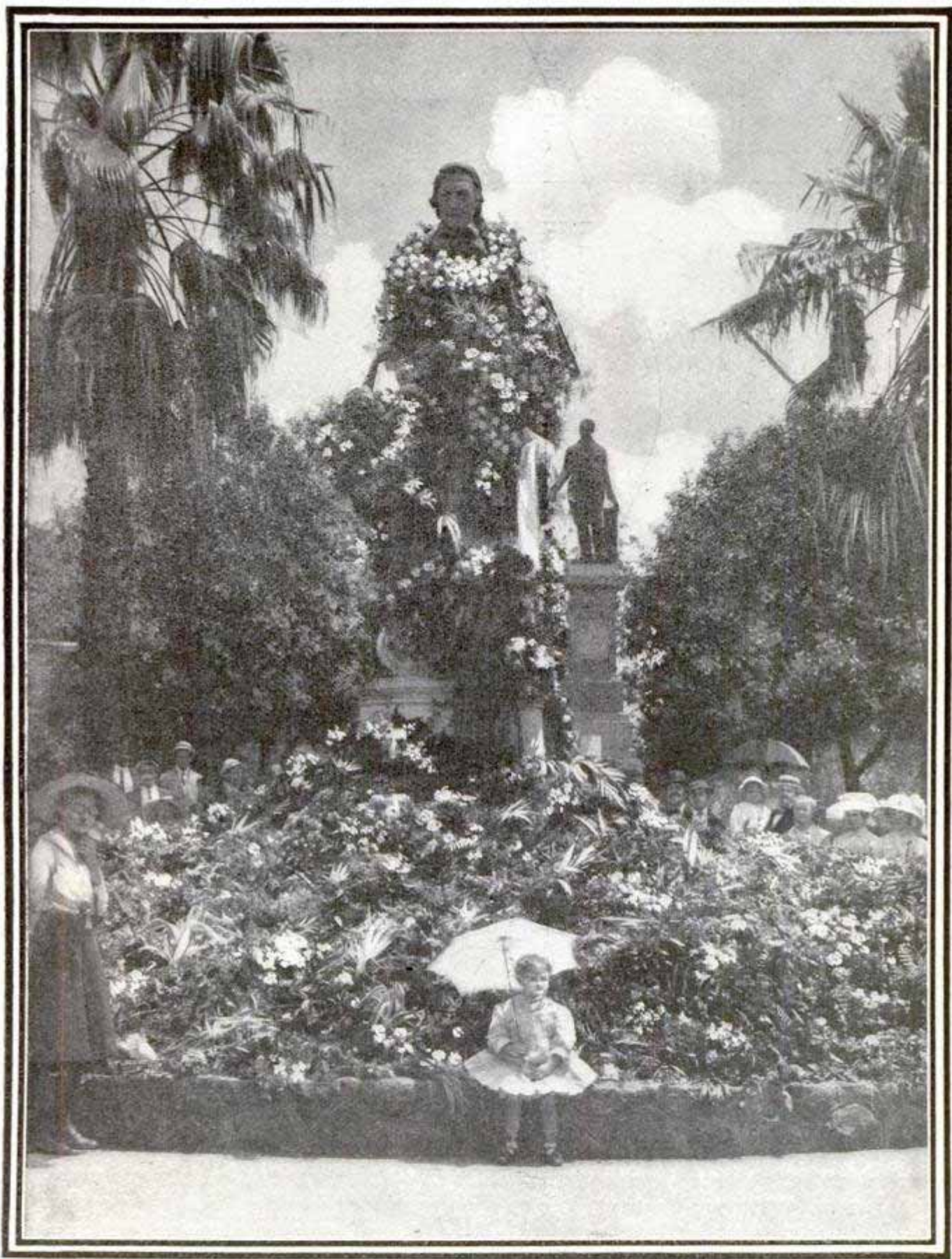
BEWARE OF THE PLUG TRICK

A trick of the kind often played on the users of gas is now being successfully worked on many motorists. The tricksters provide themselves with a supply of the cheapest possible kind of ignition plug, then call upon the unsuspecting motorists and volubly explain the marvelous advantages of the "new" plug, calling it by some fancy name. The plug is offered as the latest thing out, extraordinarily simple, practically everlasting, and capable of making an engine develop several horsepower more than its normal capacity. And the price is only \$2, or, if the prospective purchaser looks particularly

gullible, \$2.50.

The fake works oftener than would be thought possible, and those working it sometimes make a nice little haul. The same trick has been worked in past years with gas burners, an ordinary cheap burner being hawked around with stories of its marvelous gas-saving qualities, and sold at four or five times its actual price.

Successful experiments have recently been made in Amsterdam in the manufacture of fuel briquettes from pulverized street rubbish combined with coal tar from the gas works.



POSTERITY PAYING TRIBUTE TO PHILANTHROPIST

ONCE each year the children of the public schools of New Orleans gather about the statue of John McDonough, fronting the city hall building, and cover it with flowers—a pretty memorial of the efforts of this philanthropist for the cause of general education. John McDonough died in New Orleans in 1850 and under the terms of his will more than a million dollars in money and large areas of land were bequeathed to the cities of Baltimore, Md., where he was born, and New Orleans, where he made his fortune, to be used to erect school buildings. Thirty-two buildings were constructed in New Orleans from the proceeds of this bequest.

LOUD-SPEAKING PHONE FOR AUTOMOBILES

A loud-speaking telephone for automobiles is shown in the accompanying illustration. It consists mainly of a



Giving Directions to Chauffeur by Telephone

powerful receiving instrument and reproducer. The reproducer is affixed to a megaphone and the receiving instrument is suspended within a pocket in the upholstery of the car. These appliances are connected in series to any 6-volt battery. An earpiece is not required for the chauffeur, the order leaving the megaphone horn loudly and clearly.

ARTIFICIAL MOUNTAIN SUNSHINE

The scientist Bregier ascribes the benefit of sunlight at high altitudes to the preponderance of the ultraviolet rays, which induce an active superabundance or congestion of blood, lasting for hours, without any tendency to sweating. He believes that the same result can be obtained with artificial light rich in ultraviolet rays, and is experimenting along this line.

¶The smallest full-grown parrot known to naturalists is only $2\frac{1}{2}$ in. long. It is included among the specimens sent to the British Museum of Natural History by an expedition exploring New Guinea.

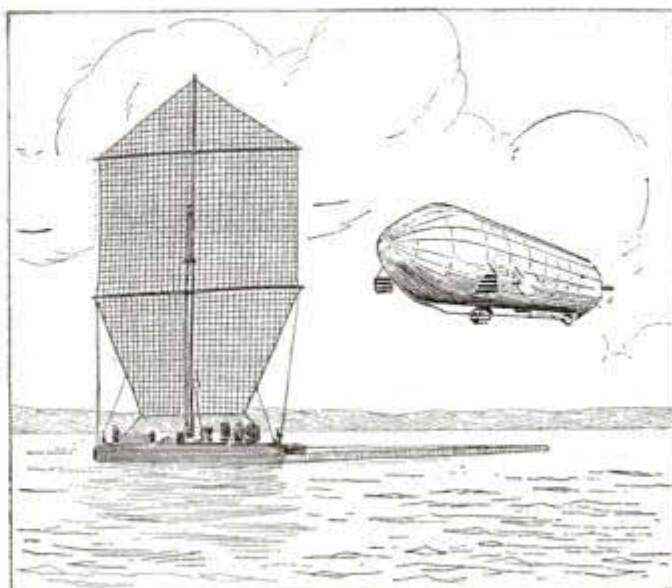
AUSTRALIAN PATENT BUTTER BOX

A collapsible butter box for shippers, recently patented and placed on the market in Australia, is said by the U. S. Consul at Sidney to be a great improvement over the type of box used at present. It is neat and durable, and perfectly rigid and viselike when put together. The four sides of the box, of equal measurement, are grooved and fitted into grooved corners, only eight nails being required. The butter shipping box at present most in use in Australia requires 40 nails. It is also claimed that the new box

can be manufactured for 35 to 50 per cent less than any other, and that 30 boxes can be made out of the material required for 20 of the ordinary kind.

WIND SCREEN TO PROTECT BRITISH AIRSHIP

The huge pontoon on which the British naval airship will be moored in preparing and returning from flights, is provided at one end with a wind screen, which rises like a great sail on



The Wind Screen for the British Naval Airship

a square-rigged ship. This screen, which is about 50 ft. high, will protect the bows of the airship from gusts of wind.

GROWING SEEDS FOR ONIONS

The production of onion seed has, within the last few years, become quite an important industry, especially in the region of the Great Lakes, where climate and soil seem to be particularly well adapted for the purpose. On the new irrigated "projects" of the West, also, considerable areas are now being

TEACH FILIPINOS HYGIENE BY MOVING PICTURES

Moving pictures are becoming important in cleaning up the Philippines—the homes and the villages where live the present generation of the former head-hunting, wild tribes of Uncle Sam in the Orient.

The varying and peculiar dialects of the several tribes in the Philippines have made the educational work of the health authorities particularly difficult. The improvement of the sanitary conditions in the huts and in the



Fields of Onion Seed Nearly Ready for Gathering

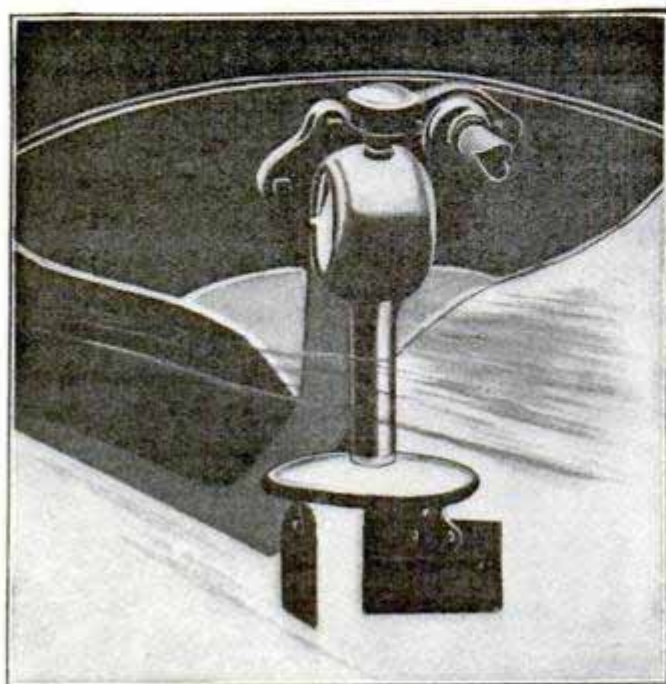
devoted to this kind of farming, which is very profitable when scientifically pursued. Only the very finest onions are used as "mother bulbs," from which to grow the seed, and thus the latter is steadily improved in quality from year to year.

One of the possibilities which came up during the International Rubber Conference, held in London, was the paving of city streets with rubber.

villages of the natives was slow work, until the United States officials hit on the plan of using moving pictures. The novelty of the "show" appealed to the native and he was made to see how improvements could be made. The lessons which the pictures teach are being taken to heart by the Filipinos; and the officials are pointing to clean houses and clean streets as a result of their campaign with the moving pictures.

FEATHERING PROPELLER ON PADDLEWHEEL PRINCIPLE

A propeller recently devised by L. Vojacek, an Austrian engineer, acts on an entirely new principle, and although



A Paddlewheel Propeller That Acts as Its Own Rudder

fitted to a boat in the same place as the ordinary screw propeller and totally immersed, is in effect a horizontal, two-bladed, feathering paddlewheel. Each of the vertical, nearly square blades is supported eccentrically under a horizontally revolving drum and is carried around with it, and at the same time a gear arrangement in the drum causes each blade to rotate so as to "feather" or turn edgewise to its direction of motion during half of its revolution.

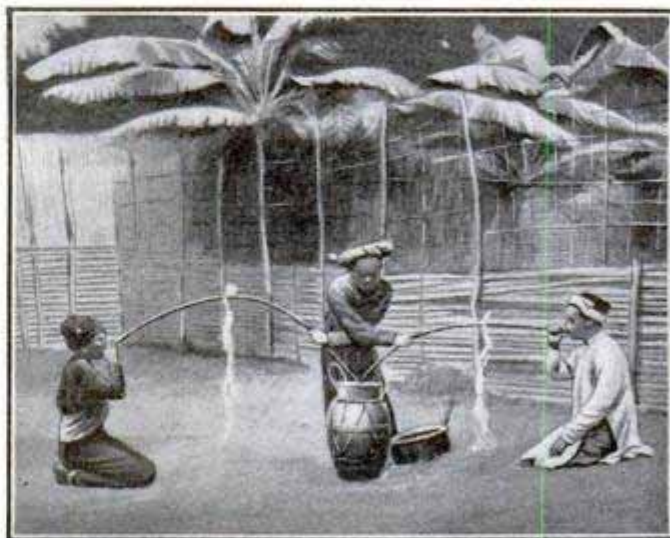
No rudder is needed with a boat having such a propeller, for by means of a handwheel connected to a supplementary gear, the feathering of the blades can be made to occur in any desired part of their revolution, thus causing the boat to go ahead, to one side or the other, or to reverse, with equal facility. In a recent successful demonstration, a launch fitted with the new propeller was maneuvered perfectly, turned completely around in her own length, and reversed from full speed ahead to full speed astern, without any difficulty.

PUTTING LIFE IN COLD STORAGE

Interesting experiments on the possibility of suspending life for a definite period are being carried out by Professor Raoul Pictet at Geneva, Switzerland. In one case he froze live goldfish in ice to a temperature of 9 deg. Fahr. below zero, and three months later gradually melted the ice and brought the fish back to their natural live state. He also kept a dog frozen for an hour at a temperature of 110 deg. below the freezing point without its dying.

A MARRIAGE CEREMONY IN ANAM

The marriage ceremony of the "Thai," a mountain tribe of the French protectorate of Anam, in Asia, is probably as unique as any now in existence. The bride and groom kneel on either side of a vessel containing rice wine, which they drink through long reeds held crosswise by the priest or "medicine man" of the tribe, who then pronounces them husband and wife and wishes them long life and happiness. After the marriage ceremony has been thus performed, the guests, together with the married couple, all partake of the wine in the same manner.



The Bride and Groom Drinking the Marriage Wine through Long Reeds

The Kingdom of Dust

By J. Gordon Ogden, Ph. D.

THIS is the sixth of a series of articles by Dr. Ogden, who is professor of physics at the Fifth Avenue High School, Pittsburg, Pa. In every home, in every office, in every shop or factory, the fight against Dust is never-ending. Dr. Ogden illuminates this subject in a manner which brings a realization of its infinite importance.

VI—The Skeleton in the Closet

IN the springtime, when Nature awakens from her winter's sleep, the disciples of Linnæus, the famous botanist, become unusually active in their quest for the flowery treasures of wood and field. Over hill and dale they roam, peering eagerly under fallen leaves, searching every secluded nook and bowered fastness, wandering by joyous brooks and rippling streams, in open meadow and sheltered vale, seeking everywhere the tiny, perfumed ambassadors from the kingdom of flowers.

And when these floral beauties are safely transferred to the tin boxes of the collector, comes the interesting work of classification and mounting for the herbarium. Such is botany as it is commonly known. And yet there is another kind of botanical research, that may be carried on at all seasons of the year, and in the queerest and oddest places imaginable.

Just think of a botanical excursion to one's cellar, or refrigerator, or attic! What would you think of preparing calmly for a botanical outing, not through fragrant wood and dell, all out of doors, but among the crevices and crannies between the teeth of your own mouth? What would you say to a delightful afternoon spent in the fuzzy forest on top of the jelly and preserves? How would it suit you to spend a half holiday in exploring the tangled jungle of a mildew on the damp towel you so carelessly crumpled up the other day and threw into a cor-

ner? These strange plants, for plants they surely are, that flourish like a green bay tree in such outlandish places, outnumber by a thousand-billion fold the higher forms to be seen in meadow and garden.

Away back in 1683 the quaint old Dutchman, Antonius von Leeuwenhoek, examining with a microscope a bit of tartar scratched from his own teeth, noted with immense concern and disgust that it contained millions of "animals," as he called them, "moving in the most delightful manner, and that they numbered more than were human beings in the United Netherlands."

This discovery of von Leeuwenhoek was reported to the various scientific societies of the day, but none of them paid any attention to it until about the middle of the 19th century, almost 200 years later. These "animals" are plants,—microbes in fact. The flora of the atmosphere—the molds, the yeasts, and the bacteria—are of paramount importance in the life history of the globe, and the interesting story of their uses and dangers, their nature and their life habits, will form the text of the remaining articles of this series on the wonderful Kingdom of Dust.

The Anglo-Saxon word for dust is "molde," and it is well named, as wherever there is dust, and that means everywhere, there are molds, the skeletons in the closet. These skeletons are not in appearance at all like

the grisly variety we see in the surgeon's back office; but some of them are infinitely more harmful than those bleached embers of humanity. In appearance they are as beautiful and as perfect as the violet or the wild rose, and the "botanist" who seeks for them may find as much pleasure in their collection and identification as he does in garnering their grown-up cousins of meadow and hedgerow.

A bit of damp bread exposed to the air for a few minutes, and then placed under a bell jar, will in a day or two furnish one with ample material for research. A bewildering forest of thread-like forms, possibly as white as fresh fallen snow, will appear, and may-hap after a few days turn green, blue, red, black or brown, with the production of untold millions of tiny spores, which become liege subjects of the vast kingdom of dust.

The great conservatories located in the principal cities of the United States and elsewhere throughout the world, afford pleasure to hundreds of thousands of flower lovers every day in the year. And yet it is possible for everybody to own a private conservatory containing thousands of times the number of plants to be found in the magnificent collections secured to the

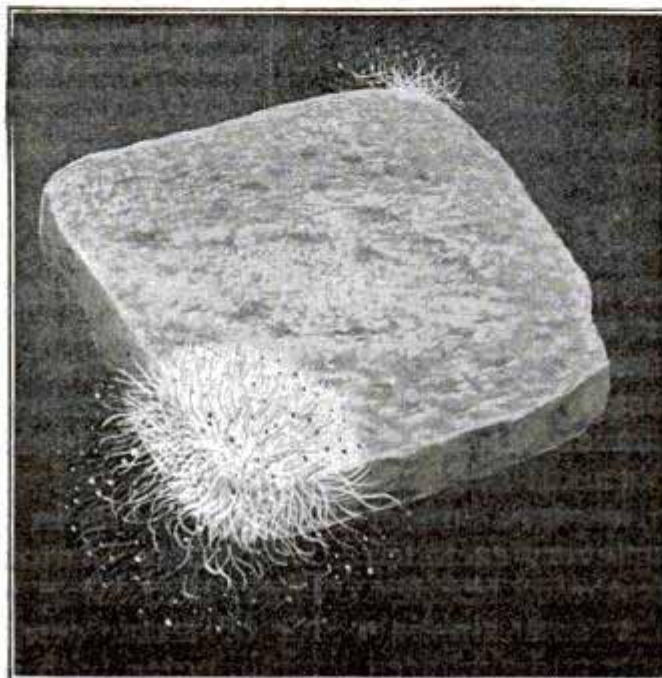
people through public or private munificence. And these private conservatories would not require much outlay, so far as expense is concerned, nor would it be necessary to send collectors to Asia, Africa or Australia to procure material.

The conservatory itself would not be immoderately expensive; as a matter of fact, half a dozen bell jars would suffice. And the material would be a bit of cheese, a scrap of bread, a piece of old leather, some old clothes, a fragment of decaying wood, a few berries, an apple whose skin is broken, a banana, a lemon, a little jelly, and some water. Here we would have abundant material for a collection that

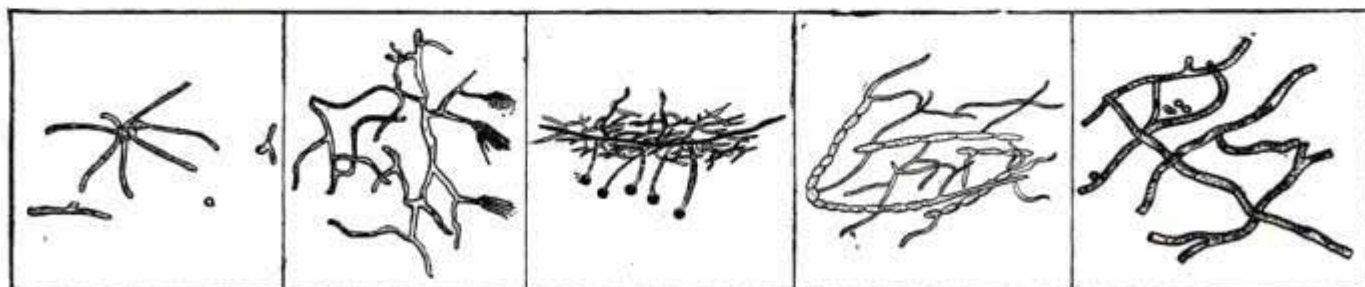
would far exceed in number of individual plants, at least, the more pretentious affairs that are dignified by the high sounding name of "conservatory."

We would not have to employ gardeners and attendants. The dust in the air would attend to all the sowing that is necessary. All that would have to be done would be to see that the temperature does not go too near to the freezing point, nor too high above the normal.

A mold is a colorless plant. It has no chlorophyll—the green coloring



A Piece of Bread upon Which One of the Common Molds (*Mucor*) is Growing



Growth of Mold from Spore

Mold Showing Spore and Spore Cases

The Common Blue Mold

A Common Mold in Apples

The Mold that Produces "Ringworm"

matter found in plants—within its cells and hence is unlike such plants as trees, or shrubs, or grass. A green plant has the power of elaborating inorganic substances such as nitrogen, carbon and water into organic substances, such as starch and sugar, oils and proteids. A colorless plant is a fungus and must subsist on organic matter prepared for it by some other plant or animal. In view of this fact, that they must have a host to provide them with nourishment, they sink to the level of parasites, and become the rivals rather than the friends of animals.

The common toadstool is a fungus, as is the mushroom, but these forms are much higher than the ordinary mold; and yet they possess many points in common, chief of which is their absolute inability to prepare a meal for themselves.



Common Mushroom
Edible Fungi

The life history of a mold is not uninteresting. It starts with a tiny spore, so small and so light that it floats readily in the atmosphere and is carried without the least difficulty from place to place. This spore finds a resting place on a bit of damp bread or other host. Soon it sends forth a tiny white thread, that makes its way into every part of the material. This thread, called the mycelium, branches out again and again, until the whole substance is permeated. This permeation is easier in the softer foods like bread and cheese, and much more difficult in compact bodies like

leather. The threads within the body of the material are exceedingly fine. On the outside of the mold-invaded matter, a delicate growth of hair-like threads soon appears. This growth is generally pure white, but changes within a few days to black, blue, green, red or brown, depending upon the species of mold that is present. The formation of the spores, the completion of the life cycle, is quite simple.

Professor Conn, in describing the production of the spores of the common blue mold, says: "After the mycelium has grown for some time, there arise from its surface tiny threads growing vertically into the air. These threads, after extending for a short distance, divide into little branches with several of the branches arising from a single stem. After these branches have grown for a short distance, they begin to be divided by slight constrictions, like rings around them, so that each one of them looks like a string of beads. These rings cut deeper and deeper into the branch until finally it is broken up into a string of a dozen or more small balls. These little balls are the spores. When seen under the microscope they appear quite transparent, but when a considerable number of them are together, they have a bluish tinge. The spore-bearing branches spring up in thousands all over the mold, and after a few days its surface is covered with a mass of thousands



Pieces of Roquefort, Stilton, and Camembert Cheese—The Dark Parts are Masses of Mold Spores

of spores, giving the mold first a slight blue color, and later a darker blue, until the entire surface finally becomes covered with the well known shade spoken of as blue mold. These spores are extremely light, are very easily blown by the winds, and readily float in the air. Every breath of air striking a mass of molds in full fruit will detach some of these minute spores and blow them away."

Most molds are harmless to mankind but cause him considerable annoyance and expense in that they prey upon his food. When a housewife comes across a dish of vegetables invaded by mold, she presumably gets rid of it by throwing it into the garbage can. Molds are likewise the enemies, or rather the intimate friends of all kinds of fruit, and if moisture, which is absolutely essential to mold-growth be present, apples, pears, lemons, berries, oranges and bananas soon "rot" as it is commonly termed. This can be prevented to a certain extent by keeping the fruit dry and the skin unbroken. Fruit, however, contains such a high percentage of water that as soon as the mycelium finds its way through a crevice in the skin, the fruit itself will furnish all the moisture needed for the rapid growth of the mold.

Fruit merchants are aware that they can keep apples and other fruits far into the spring by frequent rubbing and polishing. This is impossible in the case of thin-skinned berries, which readily fall a victim to the rapacious appetites of the different molds.

For a number of years past the Division of Pomology of the United States Department of Agriculture has been studying the problem of the "blue mold" in connection with the citrus fruits of California. Everyone is familiar with the bluish or bluish-green mold that attacks oranges and lemons. This mold, until within the last few years, cost the fruit growers of the coast about a million dollars per year. If the skin of an orange or lemon is uninjured, the spores of the blue mold are powerless to do any damage. Let the fingernail make but the slightest

cut in the tough skin, or let the fruit be scratched by nail or stone or a splinter of wood, and the orange or lemon is doomed. Immediately the spore takes advantage of the open doorway, and starts a private conservatory of its own, causing the fruit to rot in short order. Careful handling and careful packing are the only safeguards. Since the fruit growers of California have learned this costly object lesson, they have reduced the drafts made by the blue mold on their checking accounts by nearly 75 per cent.

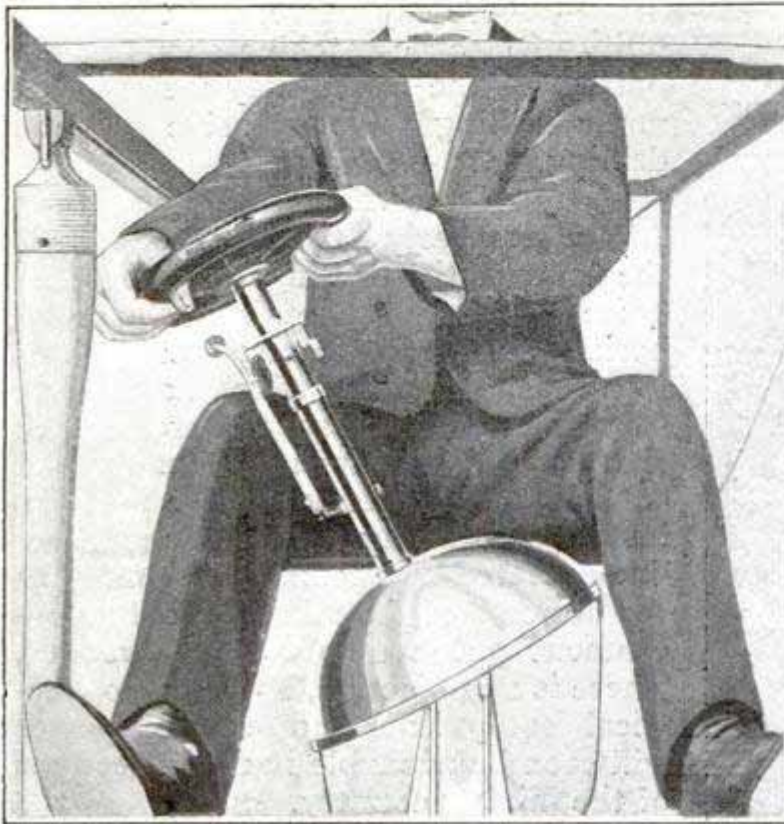
It is well known that cold storage, slightly above the freezing point, will check mold growth, but it does not prevent it absolutely, as some molds grow at very low temperatures. It is also known to the housewife that fruit that has been in cold storage for a considerable time will "decay" more readily than fresh fruit.

This is accounted for by the fact that apples and other fruits, after they have been thoroughly chilled by cold storage, will rapidly condense upon their surfaces the water in the atmosphere, when they are brought into a warm place. This dampness or dew furnishes the spores with a start, and the fruit will rot, unless the surface is frequently wiped dry.

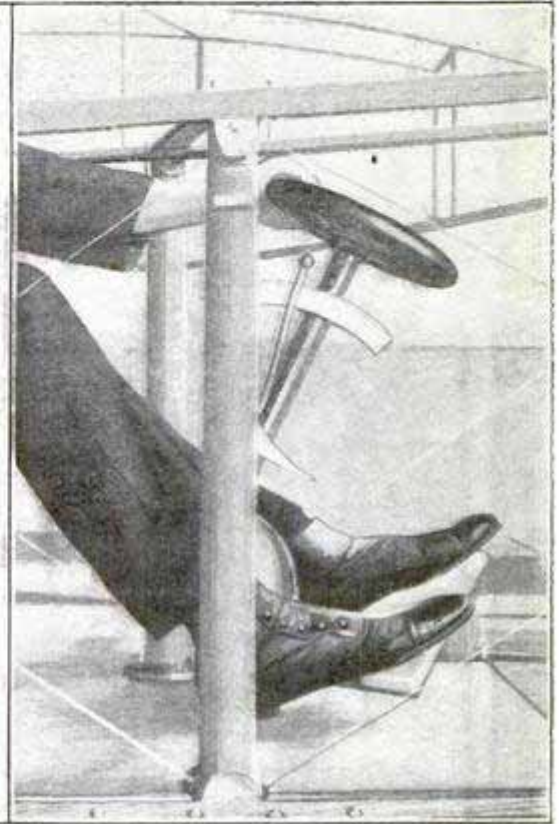
There are several molds that are daring enough to feed upon man himself, and the most common of these is the well known ringworm. The name would suggest an animal as the malefactor, but there is nothing of the animal in a ringworm, except the name. It is a plant, pure and simple, and cousin to the fuzzy molds so common on the tops of jellies and preserved fruits. Another mold that attacks the human body, and produces results far more serious than ringworm, is known as "Aspergillus." It has a decided preference for the ear, and sets up an irritation that causes considerable pain, and if neglected, great damage. Aspergillus sometimes attacks lung tissue that is slightly diseased, and the highest skill of the trained physician is needed in such cases to counteract

its effects, or to utterly destroy it. Fortunately for us, the man-eating molds are not so common as the other kinds, and since it is by molds that we get the rich flavors of Roquefort, Stil-

ton, Gorgonzola and Brie cheese, so eagerly sought for by epicures, possibly we can call the account squared between man and the Skeleton in the Closet.



The Column and Bell Base Inclined to the Right in Steering to the Right



The Column Inclined Downward in Making a Descent

CONTROL MECHANISM OF THE BLERIOT

The problem of the concentration of the control of an aeroplane in a single, yet simple apparatus, so that the wings can be warped and the machine steered right and left, and slanted up and down with the least possible complication of application has been ingeniously solved on the Blériot monoplanes. The mechanism is spoken of as a bell system of control, because of the bell-shaped base in which the column surmounted by a fixed hand wheel terminates. The bell-shaped base surrounds the pivot on which the column is mounted, and from this base extend four cables, those right and left actuating the wing-warping device, and the fore and aft cables leading to the elevating device on the tail of the machine. The mounting of the column permits its movement in any

direction. The engine-control levers are just underneath the hand wheel, and the cables to the rudder for horizontal steering are operated by the airman's feet.

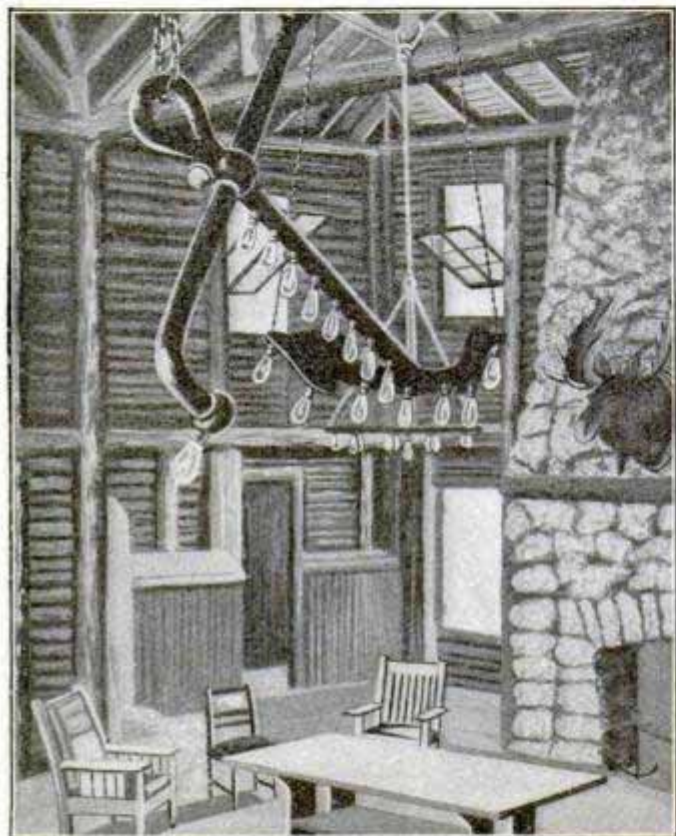
In designing the control mechanism, M. Blériot planned that the movements which would most naturally suggest themselves in an emergency should be utilized to remedy the evil. Thus, to elevate the machine, the column must be pulled backward and upward; and to drop downward, the column is pushed forward and downward. In side-steering, the warping or stabilizer cables are worked in unison with the pedals controlling the rudder, so that, in turning to the right, the right foot pedal is pushed and the column inclined to the right, and, in steering to the left, just the reverse.

But should it happen that a gust of wind tends to make the aeroplane fall on the right side, the pilot then in-

stinctively inclines the column to the left, thus causing the stabilizers to check the inclination in that direction.

ANCHOR CHANDELIER FOR BOAT CLUBS

The main lighting fixture in the general clubroom of the Lake Hopatcong, N. J., Yacht Club, is an anchor sus-



Nautical Chandelier Idea for Yacht Clubs

pended from the ceiling by anchor chains. The wiring follows down the anchor stock and across each shank to the flukes so as to serve 15 bulbs in addition to the bulb at the end of the bar. A vessel's steering wheel also makes a good nautical chandelier, with the bulbs placed around the rim or attached to the spokes.

MACHINE SHOPS IN SOUTH AFRICAN MINES

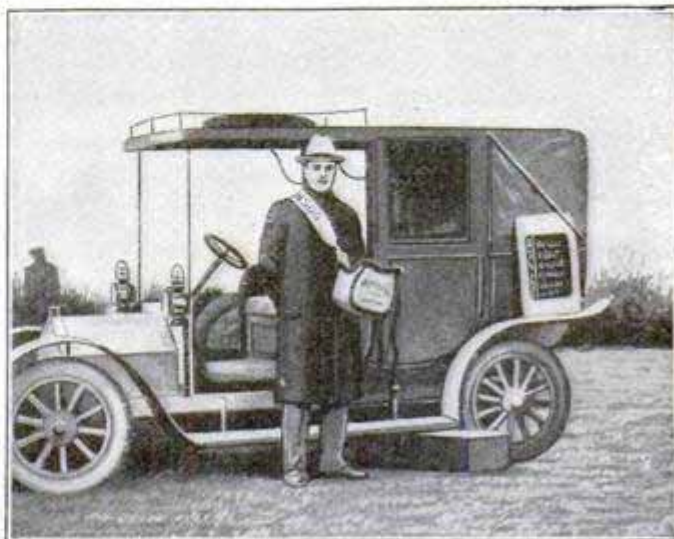
The expense of operating and maintaining pneumatic drills in the South African gold mines has been so great, compared with the hire of native hammer boys, that many of the mines still

use the latter. But labor has steadily become more expensive, and the possibility of electric machine shops at the bottom of the mines may make pneumatic drilling as inexpensive as hand drilling.

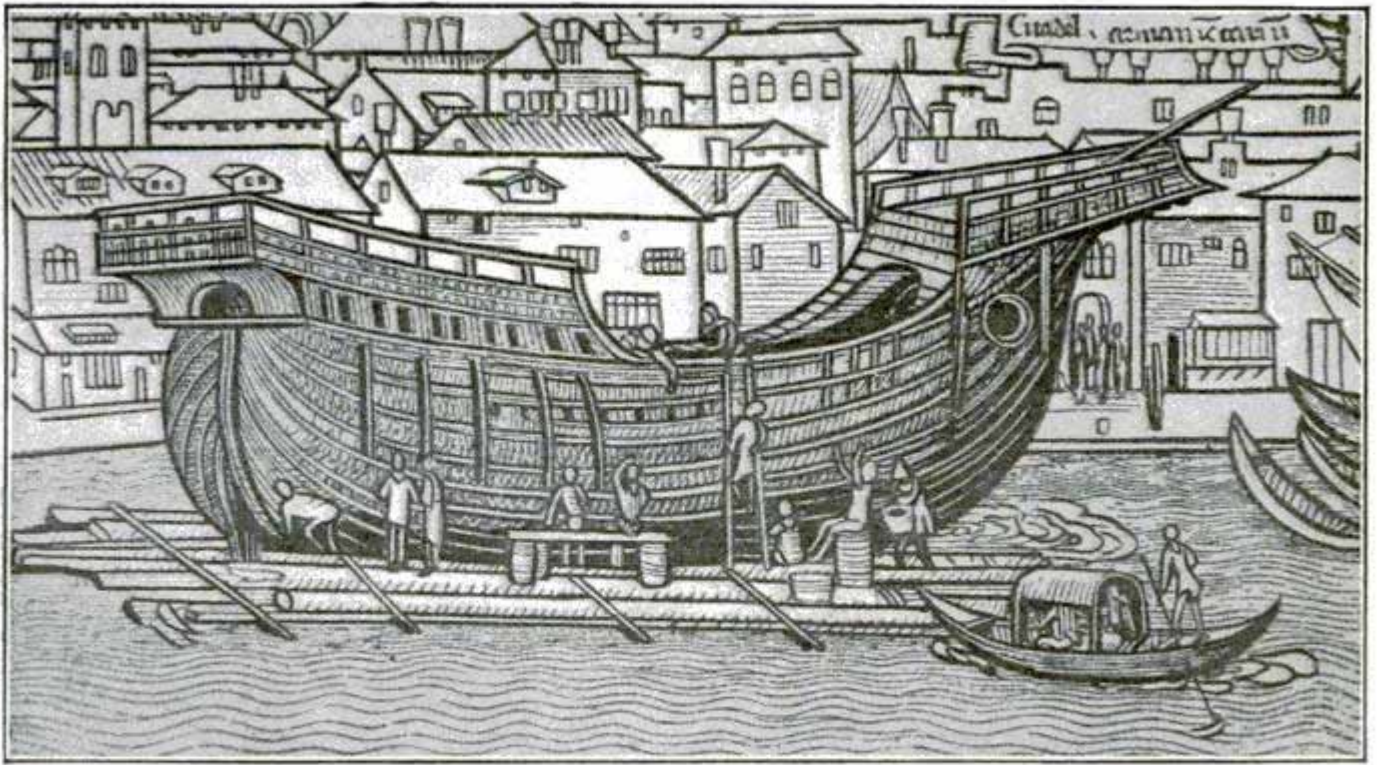
Many of the mine shafts in South Africa are nearly 4,000 ft. deep, and, as the pneumatic drilling machines require five or six sets of drill rods, numbering sometimes as many as 60 rods to a machine, all of which have to be carried to the surface for repairs or sharpening, the expense of haulage is considerable. Attempts were made to install oil-burning furnaces and gasoline-operated sharpening equipment at the bottoms of the mines, but the government put a stop to this practice. There is no objection, however, to electrical equipment, and electric power will soon be available in many sections of the mining country.

AUTO AS BOOKMAKER'S STAND

At a recent British racing meet, an automobile was used by a bookmaker as a stand as well as a means of transportation to and from the track. The horses and the odds were posted on a board resting on one of the rear mudguards.



Using an Automobile as a Bookmaker's Stand



SCIENCE AND MECHANICS IN THE MIDDLE AGES

No. 8—SHIPBUILDING. — The accompanying illustration was taken from a book published in 1486. The ship shown in the final stages of construction after launching is of particular interest because it was this type of ship that Columbus made use of in his discovery of America.

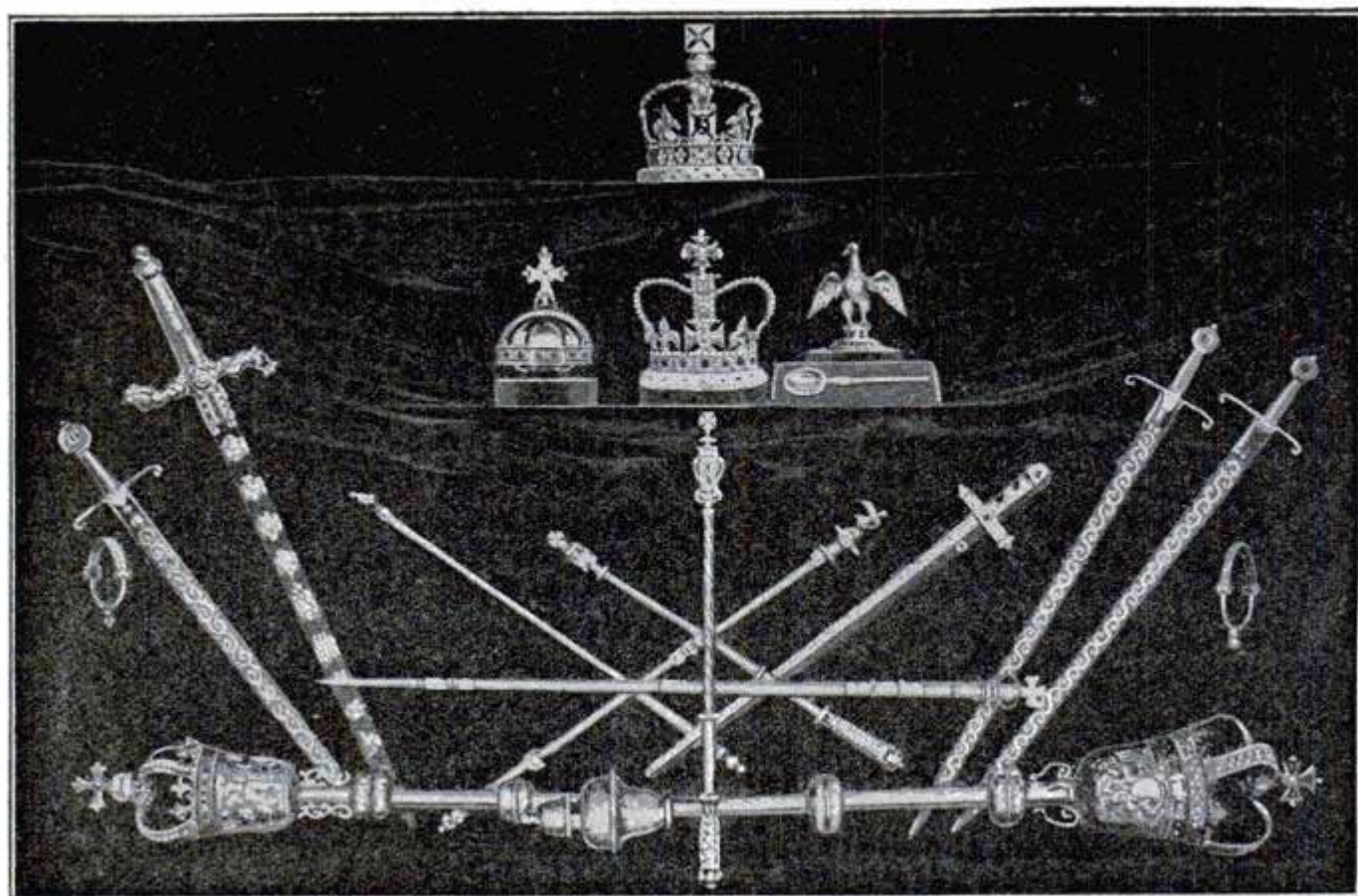
THE REGALIA USED AT THE CORONATION

The ampulla, the vessel used for holding the oil with which King George was anointed by the Archbishop of Canterbury at the coronation ceremonies in June, is one of the most interesting of the objects used in the consecrating of the kings of England.

It is believed to be the original ampulla first used at the coronation of King Henry IV in 1399, says the London Graphic. The ampulla in use before this one was of lapis-lazuli with a golden eagle at the top, enriched with pearls and diamonds, but this has long ago disappeared. The traditional form, however, remains in the eagle, which is now among the regalia, and which is a very quaint piece of goldsmith's work. The pedestal is, unmistakably, seventeenth century work. The very primitive screw with which the head of the bird screws on is much earlier than the time of Charles II. So that, on the whole, it seems probable that Sir Robert Vyner, the goldsmith of

Charles II, found the body of an ancient eagle at Westminster, and that he added the pedestal and wings. In the ampulla is placed the oil, or chrism, used for the anointing of the sovereign. According to the mediæval legend, a holy cream was given to St. Thomas of Canterbury by the Blessed Virgin herself for the anointing of the kings of England, and it was kept in a sacred golden eagle. The only kings who were anointed were those of England, France, Jerusalem and Sicily, and afterwards, by special papal license, the kings of Scotland. The use of the holy chrism was, however, reserved for the kings of England and France alone, and the sacred unguent—chiefly of olive oil and balm—thus used was identical with that used in the more sacred ceremonies of the church.

The golden eagle, as it now exists, is 9 in. in height with the pedestal, and the stretch of wings is 7 in. It is of solid gold, and weighs 10 oz.; the cavity contains 6 oz. of oil; the head



The Picture Shows the Imperial Crown (at top) with the Cullinan Diamond, St. Edward's Crown Flanked by the Greater Orb, the Ampulla and the Anointing Spoon, with the State Sword and Curtana on the Left, the Swords of Temporal and Spiritual Justice on the Right, the Royal Sceptre in the Center and the Other Pieces Forming the Coronation Regalia of England

screws off, and the oil pours through the beak.

Even more interesting than the ampulla, regarded from the archæological point of view, is the coronation spoon. The spoon has been less altered. It has been attributed by many to the twelfth century, and when in 1890 the queen lent it for exhibition at the Society of Antiquaries, the general opinion was that it was of that period. An expert, who examined it very carefully, came to the conclusion that the handle at least was ancient.

Both the spoon and the eagle are sacred objects, and are used in the most sacred part of the coronation ceremony. Their being saved from destruction by the Cromwellians may have been due to the fact that these two objects were retained by the Abbey authorities when the regalia were sent to the Tower, on the ground that they were the property of the Abbey. Sandford, in his History of the Coronation of James II, speaking of the plunder of the regalia from Westmin-

ster, excepts the ampulla and spoon—"All the Regalia," he says, "except the ampul and spoon (all which were constantly kept in the Church of Westminster) being sacrilegiously plundered away."

Among all the objects of the regalia, including the vestments with which the king is clad at his coronation, the orb appears to be the only one which is not directly symbolical of priest and soldier, but is an independent symbol of kingship or empire. The orb as an essential symbol of empire goes back beyond the time of Harold. It was used by the early Christians and the Roman emperors, and the early Saxon kings derived it from the Eternal City. After the king is crowned the orb is placed in his right hand, and it is then transferred to the left, so that the sceptre may be held in the right.

The orb is a ball of gold, 6 in. in diameter; around it runs a series of clusters of jewels between two rows of pearls. From this central band another, similarly jeweled, runs over the

top, and upon it stands a remarkable amethyst, surmounted by a beautiful cross-patée. The double rows of pearls which surround the ball and run over the upper hemisphere are of even size and fine quality; there are several hundreds of them. Between them are set rubies, sapphires and emeralds, clustered round with diamonds, the golden band showing between each cluster; and so also in the case of the upper band. The amethyst on the top is shaped like two pyramids joined at their base, the upper pyramid being the higher; the amethyst is faceted and is $1\frac{1}{2}$ in. in height. From the apex of the upper pyramidal side rises the cross-patée, which has a fine sapphire as central stone on one side and a fine emerald on the other. The cross has a central line of large diamonds along each limb, and it is completely bordered by smaller diamonds. Around the junction of the cross with the amethyst on which it stands is a collar of diamonds. Each of the three

upper ends of the cross bears a large pearl and four more of almost equal size and beauty are set in the corners.

This splendid object was made by Sir Robert Vyner for Charles II, but it would seem that since then the encircling bands and the enameled plaques, in which the jewels which adorn them are set, have been altered. The amethyst and the cross, however, seem to be in their original condition.

The actual vestments used at the coronation are to a great extent like those of old. The first vestment put on the sovereign after anointing is the colobium sindonis, which represents the alb of a priest or the rochet of a bishop. It is of fine linen and sleeveless. Next comes the dalmatic, or supertunica—a long jacket of cloth of gold with wide hanging sleeves; then the stole; and lastly, the imperial mantle. All these, except the colobium sindonis, are richly embroidered with national and imperial emblems—the rose, the thistle, the shamrock and the eagle.

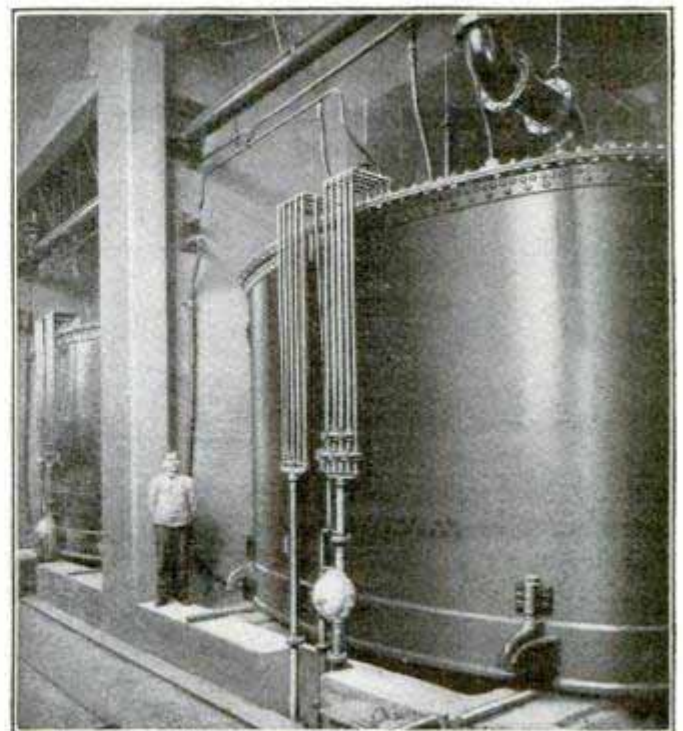
LARGEST TRANSFORMERS IN THE WORLD

The largest electric transformers ever constructed have recently been installed in the Baltimore substation of the McCall's Ferry plant, which will ultimately generate over 100,000 hp. of electrical energy from the Susquehanna River.

There are four of these transformers, each having a capacity of about 10,000 hp. and designed to convert electric current from a tension of 70,000 volts down to 13,200 volts for distribution. Each apparatus weighs complete with its oil about 145,000 lb., or nearly 75 tons. The tank is elliptical, 15 ft. 11 in. long, 8 ft. 8 in. wide, and 11 ft. 6 in. from the floor to the joint between the case and the cover, or over 16 ft. to the top of the terminal.

The terminal bushings were designed to withstand a test of 180,000 volts each for one minute. The transformers are water-cooled, as the heat

generated in the conductors is quite considerable, and underneath each of the tanks is a pit connected with a 10-in. main for draining them in case of emergency.



The Largest Transformer Installation Ever Built

GIANT SMOKING PIPE WORTH \$2,000

This giant smoking pipe, made in one piece and beautifully carved with



A Smoking Pipe that Took Two Years to Make

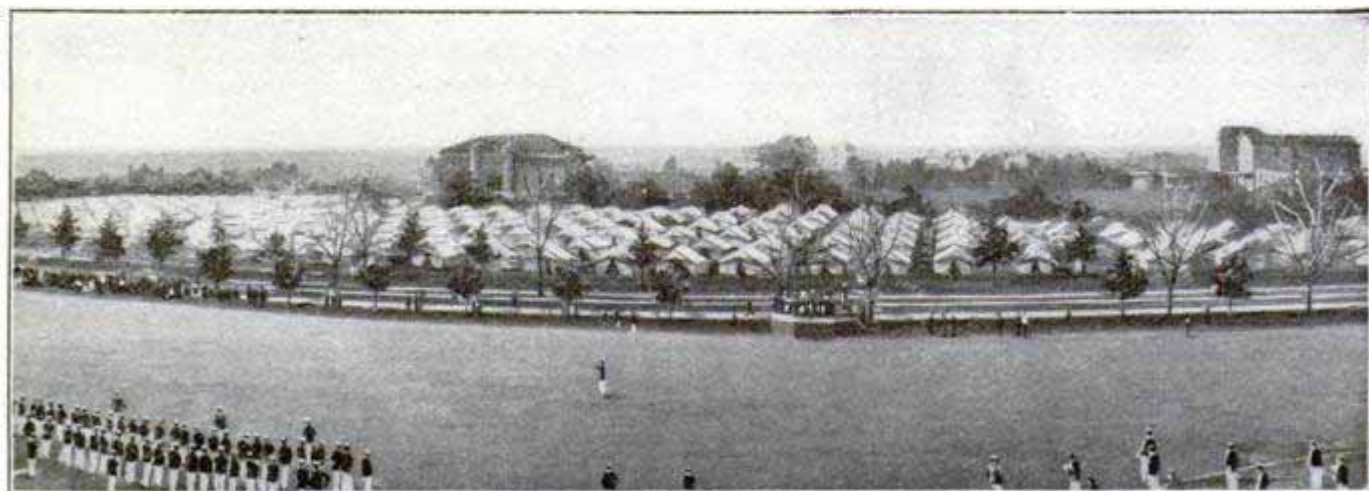
scenes of Austrian history, took two years to complete. It was done by a wood carver of lower Austria, and is valued at \$2,000.

RECORDS TEMPERATURES OF DIFFERENT ROOMS

By means of a new device, the masters of refrigerator ships and managers of cold-storage plants with numbers of storage chambers, can tell at any time the exact temperature of each refrigerating compartment without taking the trouble to examine the thermometer in the compartment. The new device is called a telethermometer. Electrical resistance thermometers are mounted in hollow metal bulbs or tubes, and one of these tubes is placed in each cold-storage compartment. The tubes are connected with an indicating device in the engineer's room or captain's cabin. To this is attached an ordinary hand magneto and a distributing switch box. All that is necessary to learn the temperature of any room is to connect that room with the magneto through the switch box and turn the handle. The temperature will then be shown on the indicating instrument.

TEXAS COLLEGIANS LIVE IN PERMANENT CAMP

The Agricultural and Mechanical College of Texas recently found it necessary to establish a tent colony to take care of the surplus students who could not find living accommodations otherwise. The Texas college is a technical institution, and up to four years ago its enrollment had never ex-



Camp of Students of Texas College Which Grew So Fast Its Dormitories Would Not Accommodate the Newcomers

ceeded 500. Since that time the student body has increased more rapidly than the funds provided for its accommodation, and the only plan to care for the 1,070 students who matriculated for the year 1910-1911 was to establish the tent colony. Accordingly, 243 tents were provided, each of which is occupied by two students. The tents are provided with floors and are heated with stoves and lighted by electricity. As the college is a military institution, the officers and men comprising an entire regiment, all of the students, from the lieutenant colonel to the youngest private, live in the tents under military rule. The tents have been occupied throughout the year and the health of the students has been excellent.

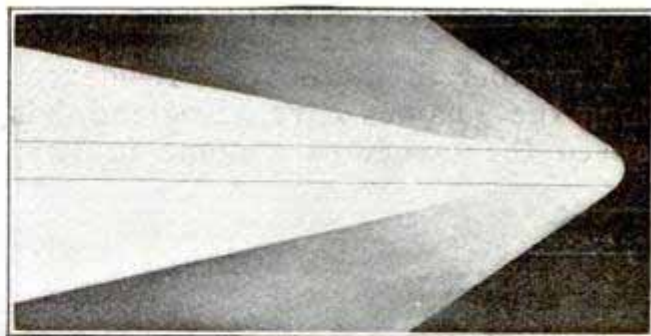
ANTI-DAZZLING DISCS FOR AUTOMOBILE LAMPS

One of the results of the efforts made to remove the various prejudices which the automobile has created is an anti-dazzling mechanism for lamps. The type of lamp to which the mechanism is fitted is one which throws out long-distance rays in a central beam to illuminate the route and wider and

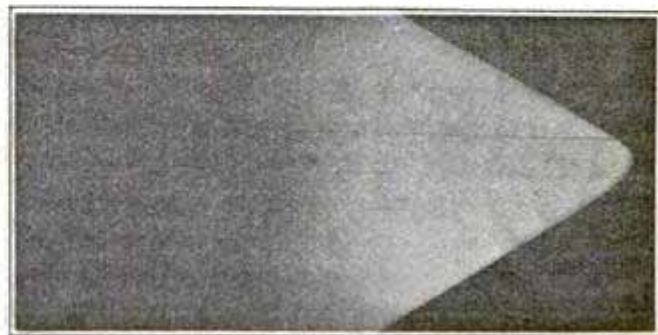


Lamp with Anti-Dazzling Disc in Eclipsing Position

more diffused rays to light the road from side to side. By pulling a little lever, the chauffeur can eclipse the central or long-distance rays, so that



Long and Short-Distance Rays of Lamp with Disc Out of Position



The Long-Distance Rays Shut Off by the Anti-Dazzling Disc

only a subdued and non-glaring light strikes any person or animal approaching the car.

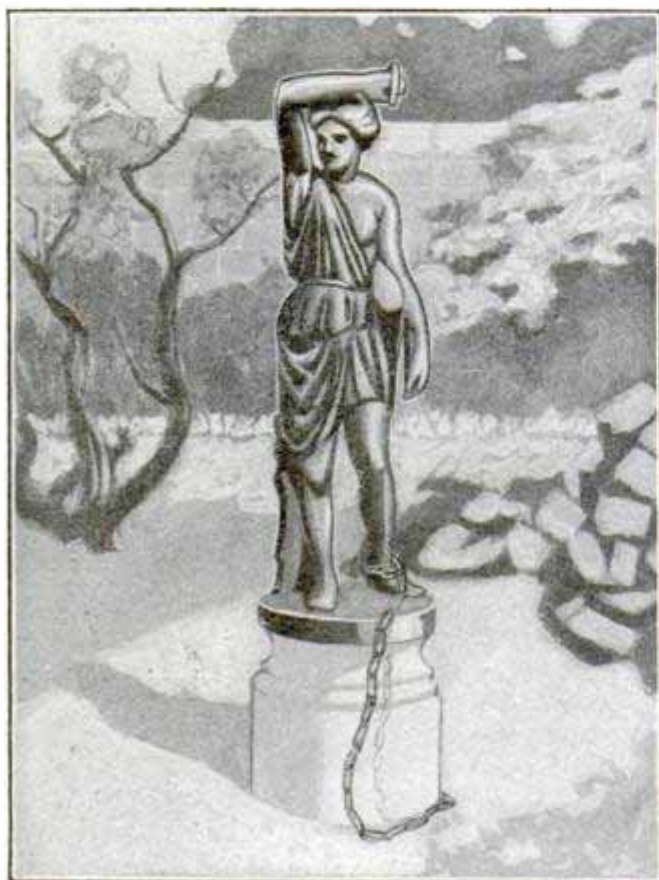
The illustrations show the lamp with the disc in eclipsing position, and the rays of the lamp when the disc is and is not in working position.

BENEFICIAL PTOMAINES

According to a report, read before the French Academy of Sciences recently, canned fish and shell fish, preserved in oil or otherwise, always contain a small percentage of certain ptomaines—from 0.02 to 0.06 per cent by weight. These ptomaines, however, do not begin to increase in any appreciable degree until two days after the can has been opened, and while the oil rather favors than prevents the development of the ptomaines, the investigators have found that they are not very poisonous. In fact, minute doses of them seem to act as a stimulant on the appetite and the digestion generally, just as the ptomaines found in cod-liver oil. It is suggested by *Cosmos*, the French scientific publication, that it might be prudent to await the further results of these investigations.

CHAINED STATUARY

A number of thefts from residences along the Thames River, England, has caused the owner of a home in East



A Statue Chained by the Ankle to Its Pedestal

Molesey to chain and padlock the lead and bronze statues in the garden facing the river. The little winged figure of the statue shown has a chain around one ankle, the other end of the chain being fastened to the base of the pedestal.

THE NATURE OF "AERIAL SICKNESS"

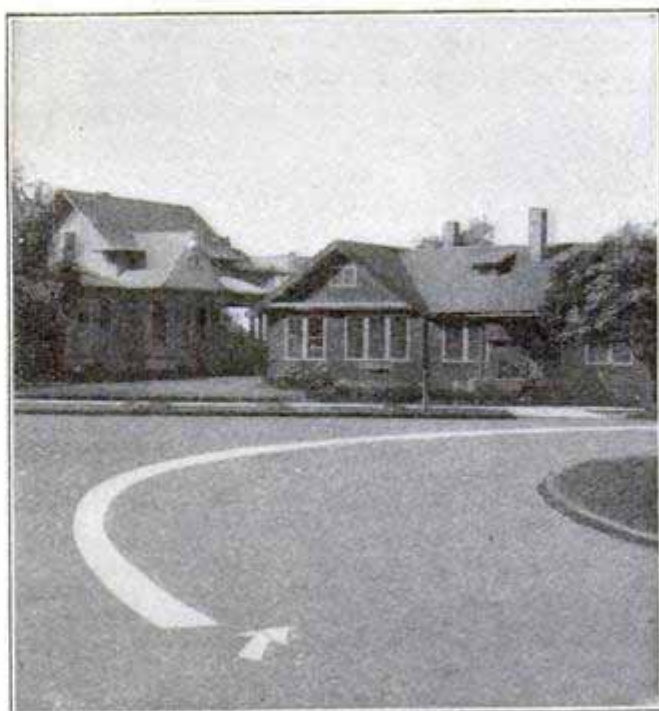
French physicians who have made a special study of the various symptoms of "aerial sickness," felt after and during flights, declare that this indisposition, which is commonly referred to as and identified with "mountain sickness," is in many respects entirely different from the latter. In "aerial sickness," the symptoms of headache, sleepiness and noises in the ears, increase after landing; vertigo is felt,

the muscles feel pain, the extremities turn blue, the pulse is much more rapid and the pressure much higher. The symptoms come on at a much lower altitude than the mountain sickness.

The French inventors of "aerial sickness" are inclined to attribute these troubles to the rapid flights and the rapid change which the airmen drop from high to low altitudes.

DANGER SIGNALS PAINTED IN CITY STREETS

A broad line of aluminum paint runs down the center of a western city street at a point where a sharp curve to the right is followed by an equally abrupt swerve to the left leading to a railroad crossing. The temptation is for drivers of autos to leave their own side of the street to shorten the corners, and to prevent accidents, the novel plan was adopted of painting a central line and a guiding arrow. As the street is smoothly paved with asphalt, the bright white mark is very conspicuous. The innovation is the idea of George S. Hinkley, city engineer, of Redlands, Cal.



Broad Paint Line Which Directs Autoists Around Dangerous Curve

MAKING VALUABLE GEMS OUT OF USELESS STONES

Whatever difficulty the plain citizen may experience in acquiring precious stones of appreciable size, the accumulation of large gems is an easy matter in a jewel workshop in New York City, where recently, probably for the first time in America, "reconstructed" rubies are being made of any desired size and of such perfection that it is only by the presence of minute air bubbles, practically indiscernible by the eye alone, that the manufactured product can be distinguished from the natural stone.

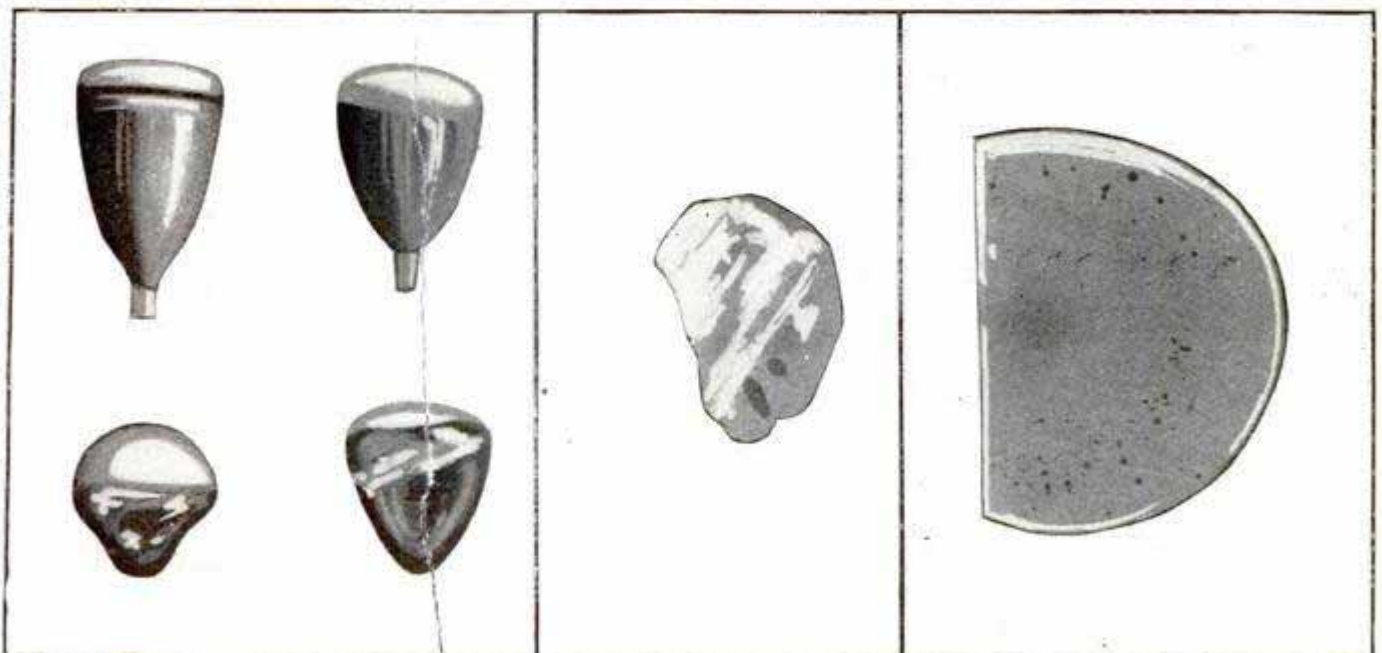
The name "reconstructed" rubies is particularly appropriate, inasmuch as the artificial gems are produced by fusing together small worthless rubies (costing at most about five cents a carat) and the residue obtained from cutting large natural rubies, by means of the intense heat of the oxy-hydrogen blowpipe. Thus the stones are real rubies and differ only from nature's product as already stated. The cost of making them is said to be about one-eighth of the value of natural stones of the same size.

It is a curious circumstance that although this process is of recent origin, it was suggested in a book enti-



Rubies Made to Order Here—Two of the Apparatus Used in New York Jewel Shop

tled "The Gas Blowpipe," by a Dr. E. D. Clarke, published as long ago as 1819. The author records the fact that when two rubies were placed



Artificial Rubies Made by Oxy-Hydrogen Apparatus

Section of Natural Ruby Enlarged Ten Times

Section of Artificial Ruby, Enlarged Ten Times, Showing Air Bubbles

upon charcoal and exposed to the flame of the oxy-hydrogen blowpipe (or the gas blowpipe as it was then called) "the two rubies were melted into one bead." Twenty-five years ago rubies were made in this way and sold under the name of "Geneva rubies" at the price of the natural gems, until the secret of their manufacture leaked out. The process of making them, however, was crude, tedious and laborious, and the cost of making large stones was very high, but still low enough to yield a fair margin of profit.

About seven years ago, a French chemist, M. A. Verneuil, hit upon the ingenious idea of introducing the ruby particles through the blowpipe itself, instead of painfully placing them on the small platinum disk (on which they were fused) one piece at a time with a small platinum forceps. This reduced the process to practically an automatic one, and it is with such apparatus that the jewel factory in New York is working.

The illustration shows two machines in this factory, both attended

by one operator. The big cylinders standing on the floor contain compressed oxygen, ordinary illuminating gas being used instead of hydrogen. The gas pipe is plainly seen on the wall in the picture. The ruby fragments are placed in a sieve which is located in the funnel seen at the top of each apparatus.

To the right of each funnel is a small electromagnetic device for operating a tapping hammer which vibrates the sieve and causes the ruby powder to fall through, a small quantity at a time, into the tube. The powder is then carried down by the gas and out at the lower extremity of the tube into the fusion chamber, where it is heated to the melting point and falls as liquid droplets on to the support below. Here it conglomerates into lumps called "boules" having a pear-shaped form as shown in the cut.

It is said that with this apparatus a boule weighing from 20 to 30 carats, and capable of yielding two cut stones of about six carats each, can be prepared in about half an hour. A single operator can attend several machines.

CAUSE OF DECOMPOSITION OF STONE BUILDINGS

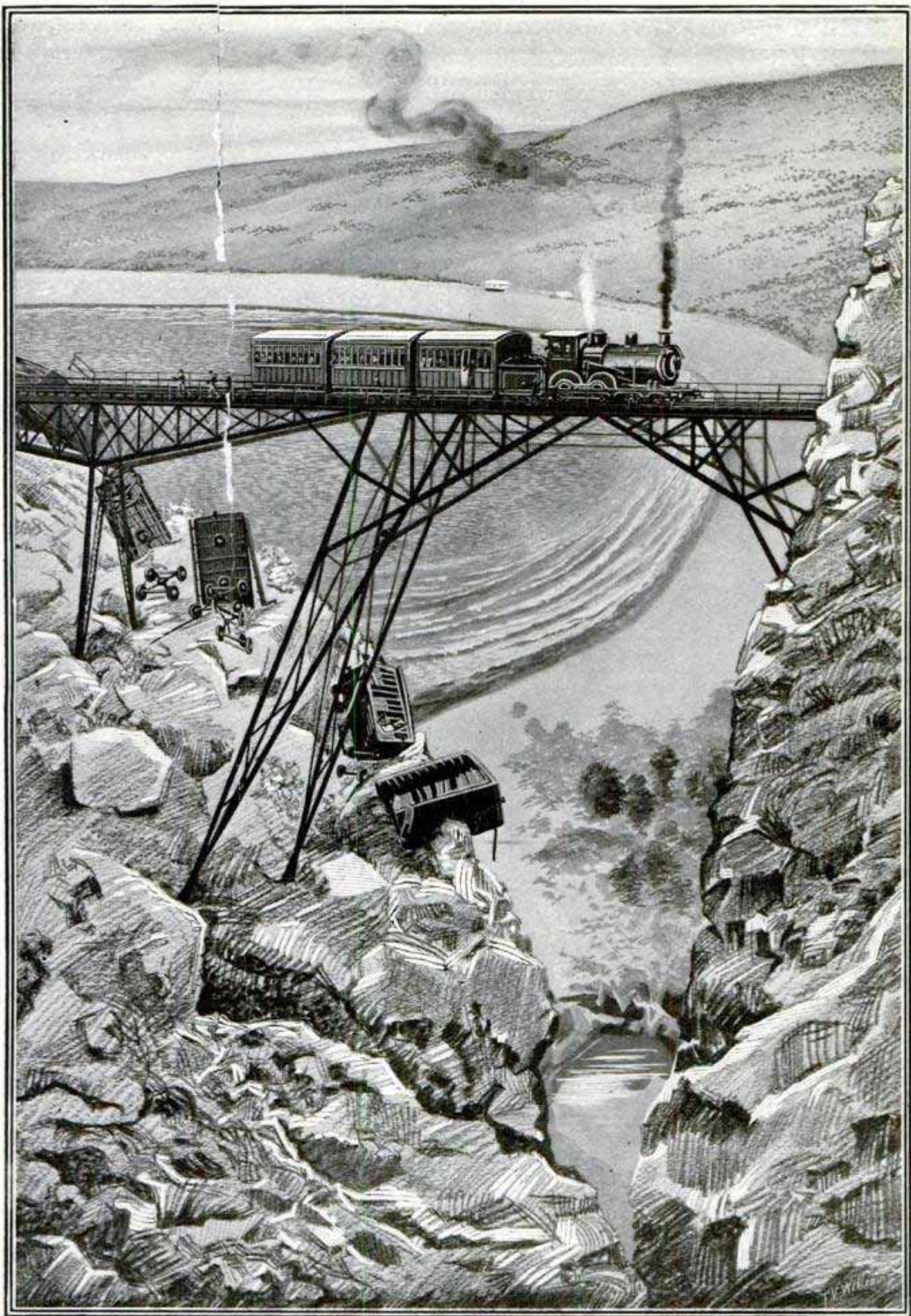
Two British scientists, Church and Rideal, claim that the decomposition of stone buildings under the influence of city atmosphere is due mainly to the presence of sulphurous acid in the air. They also state that no less than 500,000 tons of this gaseous acid is discharged into London's atmosphere every year, mainly as one of the combustion products of illuminating gas.

Under the action of carbon particles in the smoke, which make the walls dirty, this acid condenses, and, uniting with the limestone, forms a sulphate of lime. When part of the surface material of St. Paul's Cathedral was subjected to chemical analysis, it was found to contain no trace of the original carbonate of lime, but on the other hand showed a sulphate of lime content of 73.8 per cent.

TRAIN FALLS MANY FEET INTO RAVINE

One of the most appalling railway disasters of the British colonies occurred recently on the Blaaukrantz bridge in Cape Colony, Africa, the train falling into a ravine 250 ft. deep, killing about 30 passengers and injuring a like number. It appears that one of the trucks jumped the rails as the train approached the bridge, but continued running on the check rail until the coupling snapped. Then it plunged into the ravine, dragging after it the remainder of the train, consisting of four coaches and a van, as depicted in the illustration.

The handling of the wreckage on the side of the ravine was difficult, and it took six hours for the doctors and nurses to extricate the dead and injured and hoist them in sacking to the top of the gorge.



The Accident in the Cape Colony, South Africa, in Which Part of a Train Fell into a Ravine,
250 Feet below the Bridge

HIGHEST PAID WOMAN IN GOVERNMENT EMPLOY

A new record for the pay of women employed by the government has been established. Mrs. Leona M. Wells, assistant clerk to the appropriations committee of the United States senate



Mrs. Leona M. Wells, Who Draws the Highest Salary of Any Woman in Uncle Sam's Employ

gets \$2,500 a year, and it is probable that this will be increased next year.

The distinction of being the best paid woman on the government's pay roll has hitherto been enjoyed by Miss Margaret V. Kelly, who is employed in the office of the director of the mint and who during the director's temporary absence is empowered to sign his name. But when the senate committees were reorganized for the extra session of congress, Mrs. Wells got a promotion and jumped to the head of the salary list of Uncle Sam's women clerks.

She is a native of Illinois, but lives in Wyoming when congress is not in session. In the summer of 1900 she was appointed secretary to the chairman of the Wyoming state central republican committee. After McKinley's election in November, 1900, she

came to Washington to accept a position as clerk to the senate committee on claims.

Mrs. Wells is a firm believer in woman's suffrage. At home she votes and has acted as election clerk in her own precinct. By right she is entitled to the privileges of the senate floor, but custom decrees that no woman shall enter there and Mrs. Wells does not care to violate a precedent of such long standing.

After the close of the 58th congress, she prepared an alphabetical list of 50,000 private claims, each followed by a history of the case up to date. It was a big job, but it was well done and was printed as a public document for the use of congress.

ELEPHANT PLAYS SYMPATHY TRICK TO EARN HIS KEEP

Congo, a young African elephant purchased for the New York Zoological Park, proved upon his arrival to have his hind legs so badly "sprung" that he walked upon his ankles, dragging his feet. The park surgeon, Dr. Blair, fitted him with a pair of ankle braces made of leather. Within six months his legs had straightened out,



Fitting the Baby Elephant, "Congo," with Ankle Braces

and grown strong enough to do without the braces.

During his convalescence the cripple had received so much attention that he developed a very amusing trick. The public is not allowed to feed the animals, but Congo's appealing trunk thrust through the bars of his stall in the elephant house was not to be resisted. People gave him pennies, nickels and even dimes.

After a time a cash register was rigged up for the little elephant: a box into which he put the money, and then vigorously rang a bell attached to it. The money was afterward taken out and spent for peanuts during the week, in addition to the six quarts which each elephant receives on Sunday morning. Congo quickly learned to connect the taking of the money from the box with the extra treat, and so strictly does he attend to the business of keeping the box full, that its contents now pays for all his food.

"CLIMBS" DOWN SKYSCRAPER BY FINGER AND TOE

John Hassler, a steeplejack of Philadelphia, recently astonished the citizens of that town by descending on the face of an 18-story building, without mechanical assistance of any sort, using only the grip that he obtained by hanging to the interstices of the stonework with the tips of his fingers and digging the tips of his toes into the spaces as he felt his way to the ground.

The building was the Morris Building, a new structure at the corner of Broad and Chestnut streets, Philadelphia's busiest center. The steeplejack, whose sole object in attempting the daring feat was to show that it could be done, swung himself from the roof by a rope, and, dangling at a giddy height from the sidewalk, felt for a safe spot on the sheer face of the building from which to commence his descent. When he had secured a good hold with the tips of his fingers, he kicked the rope out of the way and began his finger and toe descent.



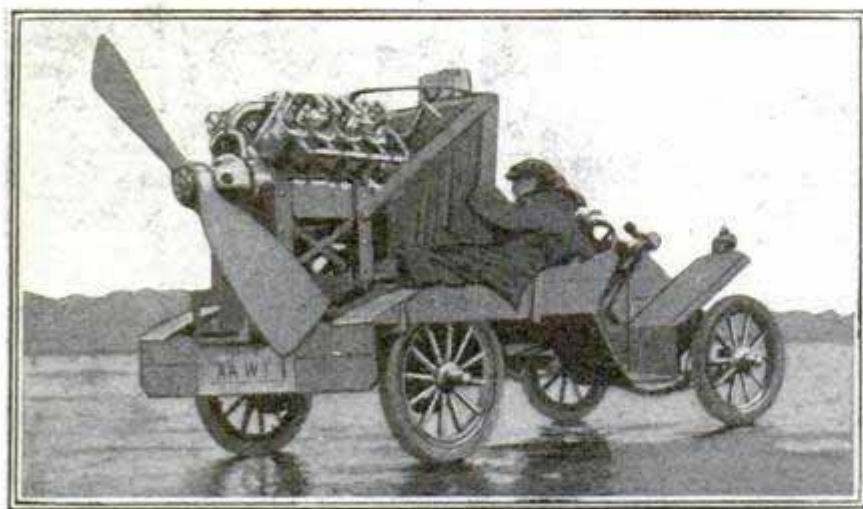
A Philadelphia Steeplejack Making a Perilous, Fly-Like Descent on the Face of a Skyscraper

The crowd watched him breathlessly, for it looked like certain death from the point of view of the spectator on the sidewalk below. The steeplejack worked slowly down, feeling carefully for a place to insert his toes and hanging for dear life with his finger tips. Once his toehold slipped and the watchers groaned. But the wonderful fingerhold that the steeplejack has developed during a lifetime of giddy climbs saved him, and he clung until he secured another toehold. In this way he made his way a few feet at a time until the sidewalk was safely reached.

CA good rustproof pigment may be made out of certain varieties of slag produced in open-hearth steel manufacture, according to an announcement recently made by the U. S. Office of Public Roads.

AEROPLANE PROPELLERS TESTED ON WHEELS

This roughly turned out machine is being used on the Brooklands automobile track in England to secure data



Used in Propeller Experiments

regarding the wind pressure and thrust of aerial propellers at various speeds. It is said that the machine can be driven at a high speed by the powerful motor and propeller.

ANOTHER OIL THEORY

The latest theory accounting for the presence of natural oil in the earth is set forth, apparently in the most serious manner, by W. M. Stephenson in a recent issue of *The Oil and Gas Journal*. It is pointed out that gypsum and limestone together possess the necessary elements and in the right proportion for the making of mineral oils, and it is suggested that natural oil has been produced by the interaction and decomposition of these two materials, which often occur together in nature. Corroborative evidence is adduced to show that these minerals are often present in natural oil fields, and that sulphur is usually found dissolved in the oil in amounts corresponding to the quantity found by analysis to occur in gypsum (sulphate of lime). According to the theory, 1 cu. ft. each of gypsum and limestone would produce 3.34 gal. of crude oil.

SIMPLE DEVICE AIDS IN RESUSCITATION

The resuscitation of a drowning person by means of artificial breathing is not only a laborious undertaking, but the motions must be correctly executed or the attempt will prove unsuccessful. A Swedish physician has constructed an exceptionally simple and effective apparatus which lightens the task materially and adds immensely to the chances of success. It consists of a short board on which the patient is placed, two levers to which the arms are fastened, attached to the board, and a wide belt or girdle fastened to the levers and passing over the patient's breast. When the levers are pushed backward, the arms follow and the chest is inflated; and when the levers are pushed forward and down, the girdle presses the air out of the lungs.

AN ADJUSTABLE MIRROR FOR TRAVELERS

An ingenious mirror for shaving or other toilet purposes, designed especially for the traveler, is shown in the accompanying drawing. The mirror is held at any convenient angle, distance, or height from the face by a frame which slips over the neck and rests on the chest. It may be used alone in shaving the face, or in conjunction with a large stationary mirror to provide a view of the back of the neck. The frame or holder is collapsible.



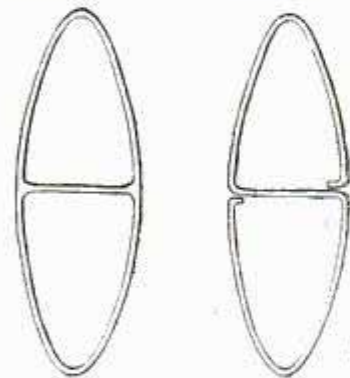
A NEW REFRIGERATING PROCESS

A new chemical refrigeration process, introduced by Dr. Repin, a French chemist, uses the expansion of sulphur dioxide gas to produce a low temperature, the gas afterwards being absorbed by camphor containing 20 per cent of naphthol. The naphthol prevents excessive foaming and melting of the camphor when the latter is heated to drive off the sulphur dioxide gas for compression and reuse.

This new process was evolved to correct a defect of the well known ammonia process, which uses the expansion of ammonia gas to produce a low temperature, the expanded gas being absorbed by water. When the water is afterwards heated to drive off the ammonia for reuse, about 25 per cent of the water is carried over by the gas, which interferes largely with the efficiency of the process.

REINFORCED STEEL TUBING FOR AEROPLANES

Extraordinary rigidity, strength and lightness combined with little resistance to the air, is claimed for a steel tubing especially designed for aeroplane construction. The tubing is made in one piece, electrically welded at the



two side-joints. As the diagram shows, it is bent from a single band of sheet steel, and is so shaped that it offers but little resistance to the air currents.

THE LARGEST GRAPEVINE IN THE WORLD

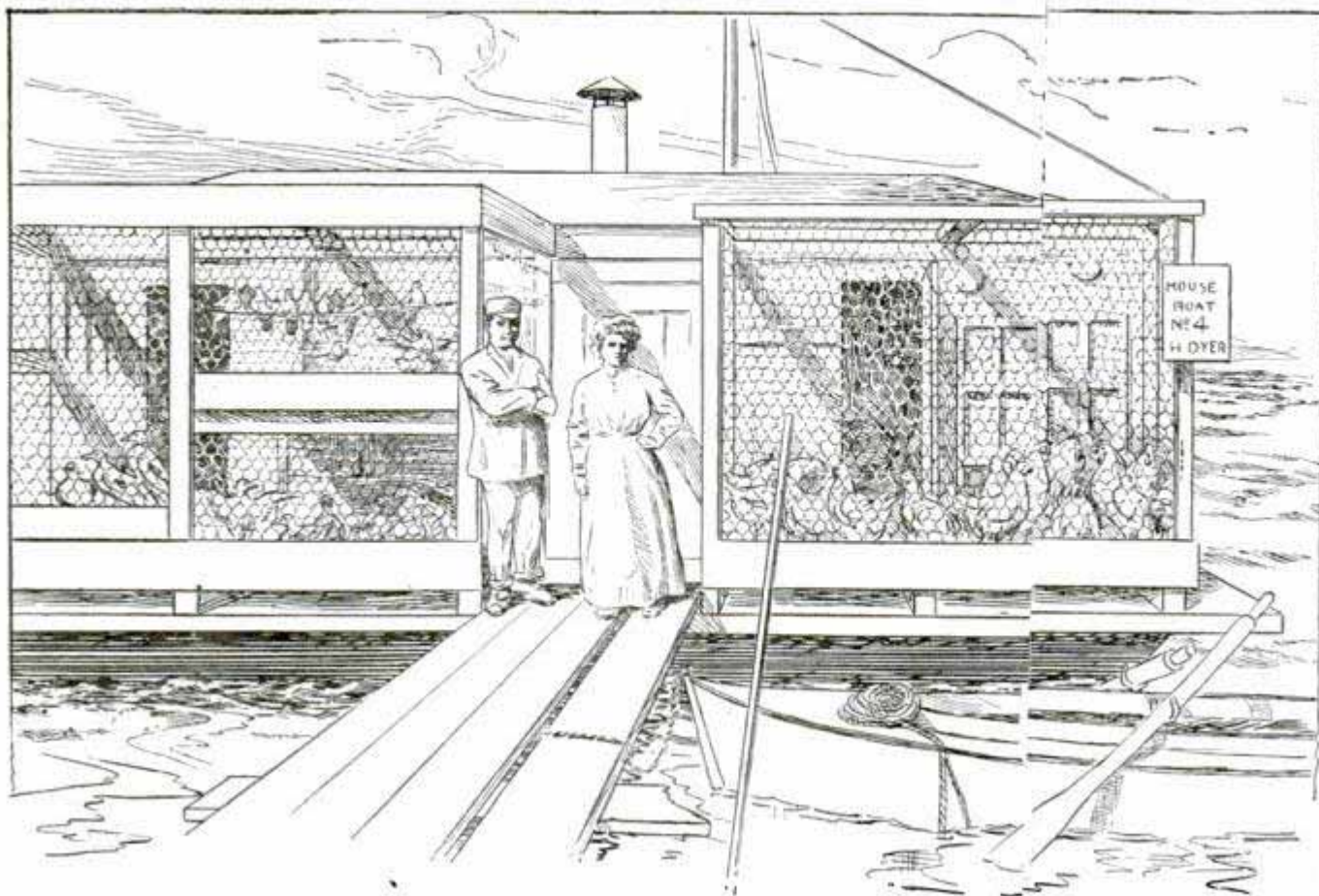
Out in Carpinteria, Cal., is a grapevine that is said to be the largest in the world. This vine was planted in



Grapevine Eight Feet in Circumference

1842 by a Spanish woman and beneath its spreading branches which cover more than an acre, 800 or more persons can find protection from the sun's heat. The first election in Santa Barbara County under American rule was held under its ripening fruit. The vine is of the Mission variety. In 1893 it bore 8 tons of grapes, and in 1895, 10 tons. The trunk is nearly 8 ft. in circumference.

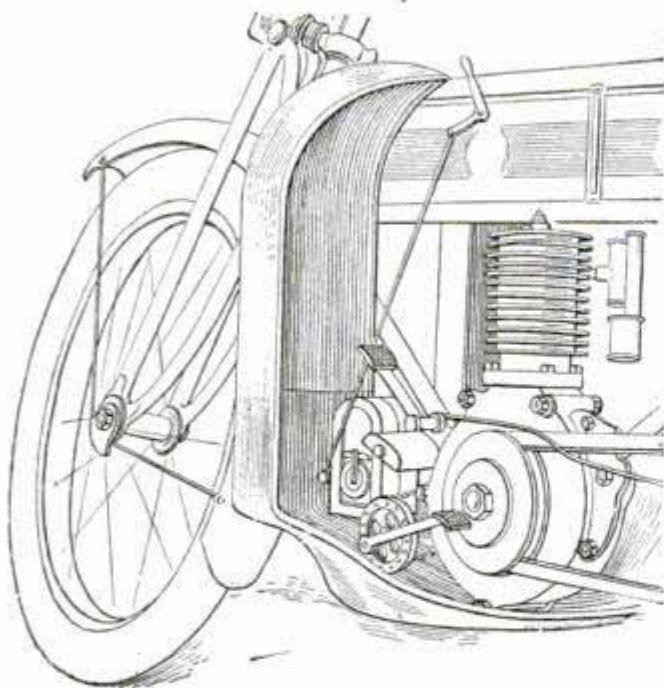
It is difficult to determine how long grapevines will grow. Officials of the Department of Agriculture declare that they have yet to find a wild grape which has died of old age. Some authorities state that the vine equals and often surpasses the oak in point of age. Pliny mentions a vine 600 years old. There is a vine at Hampton Court, England, planted in 1769, while here in America there is a wild grapevine on the shores of Mobile Bay, within a mile of Daphne, Ala., commonly known as the "General Jackson vine," from the fact that General Andrew Jackson twice pitched his tent under it during his campaign against the Seminole Indians. This vine is more than 6 ft. in circumference at its base.



A Poultry Farm on a Houseboat at Atlantic City

MOTORCYCLE MUDSHIELD

A cleverly constructed mudshield is shown in this illustration. It not only



Mudshield and Air Deflector

protects the rider from mud, but at the same time deflects cooling air currents onto the cylinder.

HOUSEBOAT POULTRY FARM

A houseboat might be considered one of the last places in the world where poultry farming would thrive, yet such a poultry farm is run at Atlantic City, New Jersey, and it is considered a success.

SAFETY BELT FOR AIRMEN

M. Esnault-Pelterie, one of the French airmen, has devised a safety belt designed to keep airmen from being thrown from their machines and to help break the shock of falling with the aeroplane. It consists of a broad leather strap, which covers the whole of the chest and part of the abdomen, to the ends of which are attached powerful elastic straps, which are in turn made fast to the machine by leather straps. Should the aeroplane meet with an accident, the shock is taken up by the elastic, and the airman is kept in his seat until parts of the framework or the wing structure have broken the fall for him.

THE PSYCHOLOGY OF WAR

All soldiers are subject to fear and panic, even the most seasoned veterans of the best army in the world. It is all a question of the effect of certain things on the human mind, in other words, of certain psychological processes. One of Napoleon's greatest victories was at Wagram, and yet the troops who won the day by their heroic fighting had fled in utter panic during the preliminary engagement of the night before. A similar thing occurred during the Civil War, when the Union troops who fled in the morning at the battle of Winchester, returned at night and won a decisive victory.

What caused such a reversion? Capt. Leroy Eltinge, 15th U. S. Cavalry, writing in the *Journal of the United States Cavalry Association*, says there are two factors that enter into consideration: (1) physical condition, (2) purely psychological conditions, the first tending to some extent to produce the second. With a crowd of men who are worn out, sick, and exhausted, the slightest suggestion is liable to produce a quick and most profound effect. What the effect will be depends on the suggestion. If some one says "We are outflanked," or, "The enemy is in our rear," a stampede occurs, and most of those who run do not even know the supposed reason. It is enough for them to see the other fellows going and they run too. On the other hand, if the right man at the right time puts in the suggestion, "We have them going now; come on, let us rush them," the same kind of a blind movement is made, but this time to the front, and victory results instead of demoralization and retreat. Such is the power of suggestion.

After all, an army is a crowd, and its collective mind is not at all indicative of the minds of its individuals. A sudden impulse will affect it and produce curiously concerted action, as with all crowds. Hence, the spirit which impels an advance, a passive defence, or a retirement, may well have

been transmitted by the leaders. The leader whose own ideas are not clearly defined and whose intention is vacillating will get only half-hearted action from his troops, while a determined man who has one clear idea will himself be surprised to see how quickly and energetically the troops respond.

Men of different nationalities respond differently to the same influences, and this is an important consideration in armies which are made up of several races. Thus the Anglo-Saxon fights stubbornly in defeat, but is not so brilliant in attack as the Latin who, although he is usually more enthusiastic and dangerous while his attack is succeeding, nevertheless sinks into the deepest dejection and hopelessness under a reverse. A big war will now make it necessary to combine all these various elements into one, in a mixed army like that of the United States.

Panic is the inevitable issue in war. All men are subject to it. The victor is he who is able to resist it the longer. One example of panic, in the form of illusion, was evidenced in the Russo-Japanese War when the Russian fleet, en route for Japanese waters, fired on peaceful English fishing vessels in the North Sea, believing them to be Japanese torpedo craft. Hallucination is another form of panic. For instance, during the campaign of 1793, a brigade commander named Felix, while posted in an advance position, abandoned his detachment before the first shot was fired and fled whip and spur to headquarters, 13 miles off, where he asserted that his troops had been annihilated by the enemy. This officer had previously distinguished himself for bravery. Balck said truly when he remarked "The spectre of panic stalks by the side of enthusiasm."

Incredible as it may appear, it seems that, except in the way of leaders, intelligence is of little value in war; the army that can resist panic the longest is the victor. Even troops composed of men of proved individual courage

will not be inaccessible to collective fear. The gladiators of Spartacus, in revolt, were put into full rout by an army of soldiers of little individual courage, but of better organization and leadership.

Joint responsibility and confidence are two essential factors for steadiness of troops in combat. For this reason it is better to put the picked men on the second line of battle rather than in front, in order to give confidence to those who are struggling directly with the enemy. Another important point is that troops must fight in the organization they are used to in time of peace, each man in his habitual place and with his proper unit. Napoleon had this in mind when he said of his soldiers at Waterloo: "They had not eaten soup together long enough."

The moral effect of a surprise, a cavalry charge, or a continuous bombardment is truly astonishing. And yet the element of fear is always greater than the danger involved. At Liao Yang, Kuroki had before him 300 pieces of artillery that fired unceasingly for 11 days. Yet it was estimated that for each man reached, over

500,000 projectiles, including the fragments, were fired.

Only about five men out of a hundred remain cool enough in battle to fire with anything like accuracy, and, curiously enough, this percentage is practically the same in all armies, when the fire is returned.

The Boer commander De Wet, whose wonderful exploits filled the newspapers for a while during the latter part of the Boer war, records the fact in his memoirs that on two different occasions his burghers ran away under the fire of artillery without having lost a single man. A combat is entirely an affair of morale. At Magersfontein a British regiment returned the Boer fire for three minutes and then broke. It lost 10 per cent of its effective strength, which is a big loss in three minutes. This was enough to give the enemy the ascendent morale.

All men are subject to fear. It is the example of his officers and his own sterling character, which, aided by discipline, will enable the soldier of today to develop that morale which is the main element in the winning of victories.

DEMOCRATIC CARRIAGE OF AMERICAN AMBASSADOR

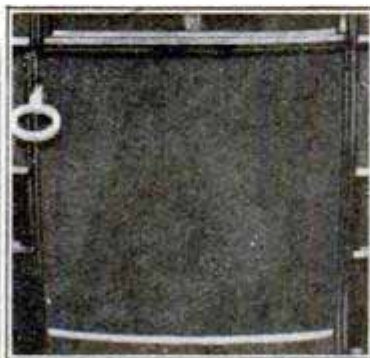
Under the title of "Arms and the Man," one of the London illustrated magazines recently published illustrations of the arms on the carriages of the eight great ambassadors to the British court, so that its readers will be able to distinguish one from the other. One of the eight illustrations

showed the door of the American ambassador's carriage, which stands unique among the others as not fitting the title, "Arms and the Man," there being no "arms" upon it.

Electrical energy of 180,000 hp. was being produced from Niagara Falls in 1910, says a recent report of the New York State Water Supply Commission.



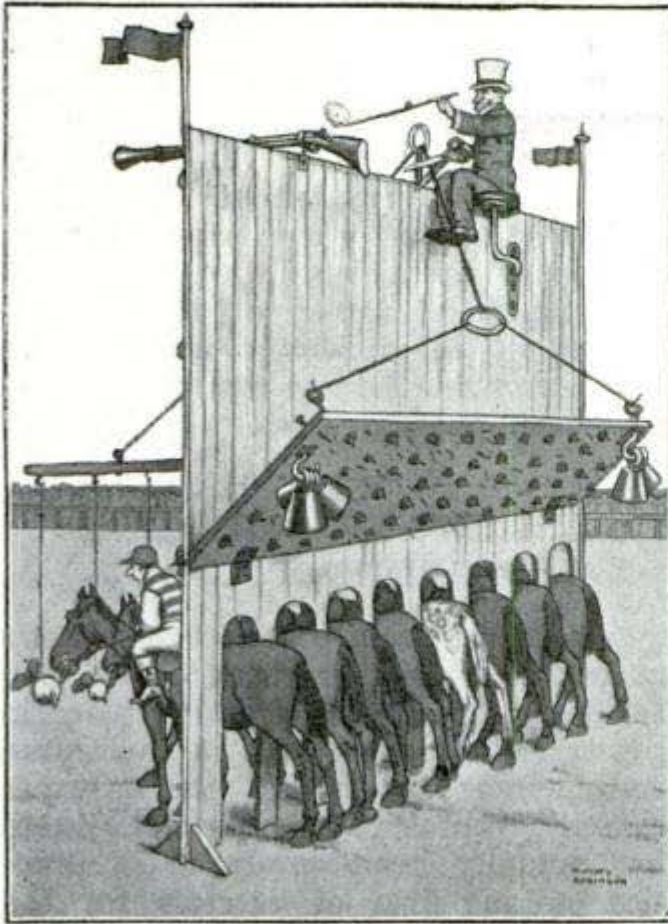
The German Ambassador's Arms



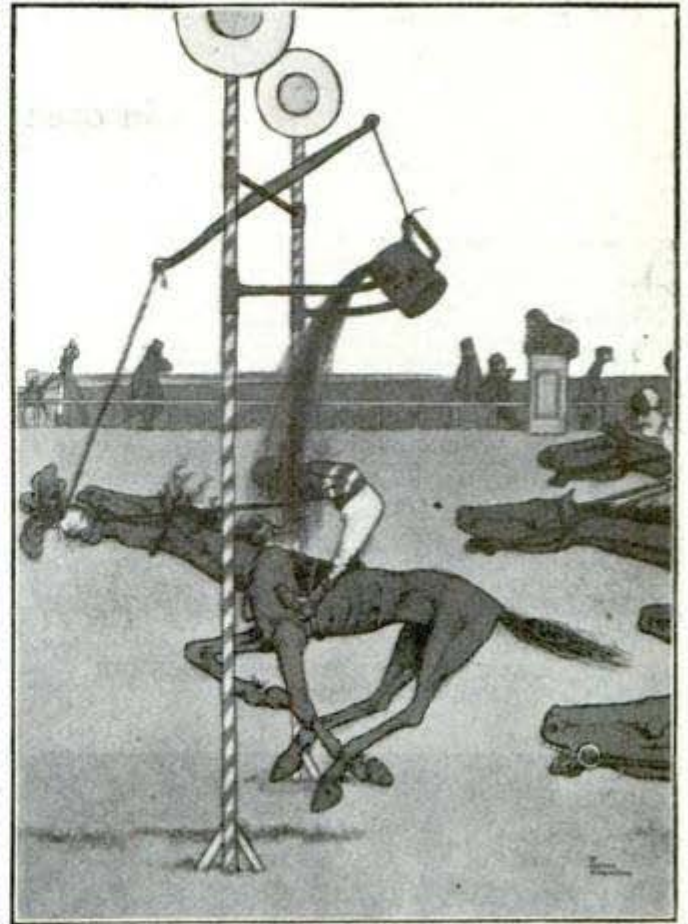
The American Ambassador's Carriage



The French Ambassador's Arms



The Start



The Finish

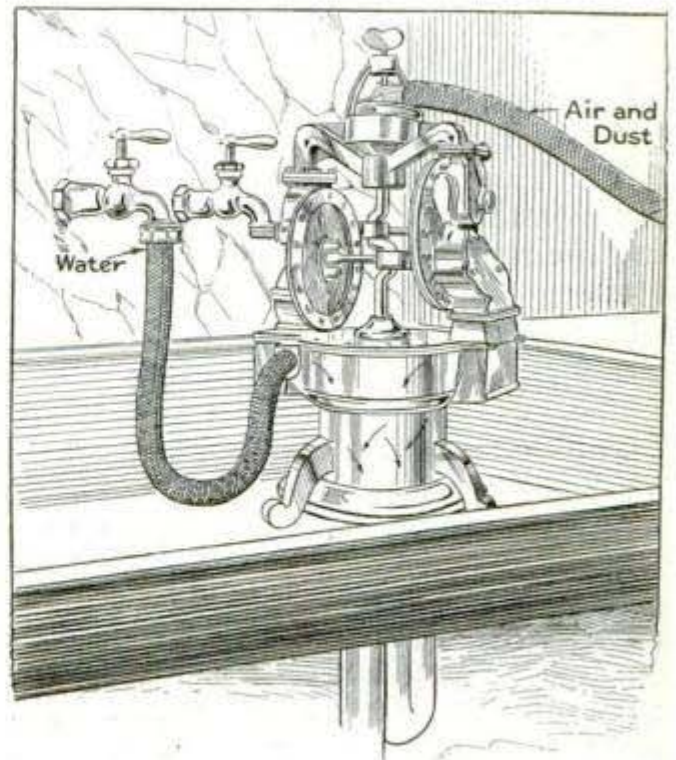
PROPOSED METHOD OF RUNNING THE DERBY

An idea advanced by an artist of the London Sketch that would end fake starts and insure the marking of the winner.

WATER-OPERATED VACUUM CLEANER

An ingenious portable vacuum cleaner, operated by water power, has made its appearance on the market. It consists of two suction pumps, operated by a direct-connected waterwheel, and a chamber in which the dust and dirt mix with the water discharged from the wheel. The machine, which weighs a little less than 25 lb., is intended to sit over a sink or bathtub, and the dirt and water pass out through the waste pipe. It is claimed the machine will work satisfactorily under a water pressure of 15 lb., and with a 25-lb. pressure produce an efficiency in excess of a machine operated by a $\frac{1}{8}$ -hp. electric motor.

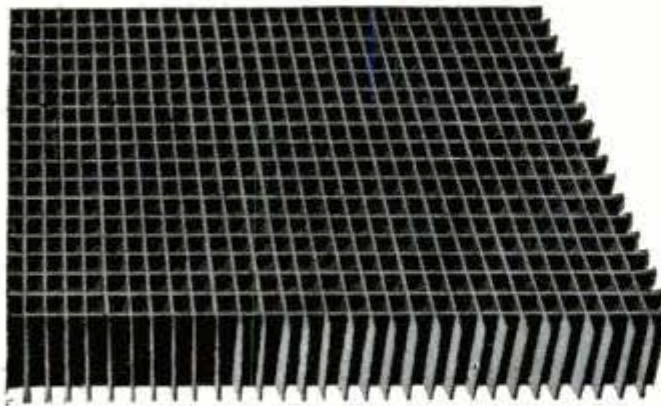
Of the immense amount of electricity sold every year in Chicago, only 30 per cent is used for lighting, the rest being used for power purposes.



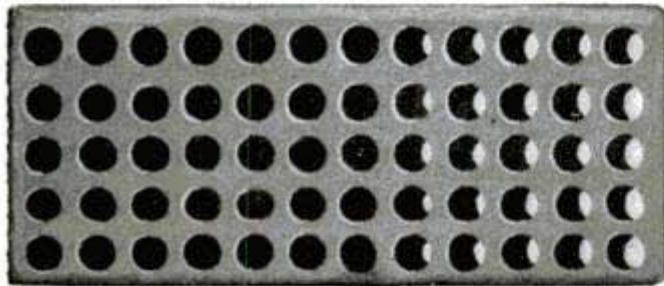
Vacuum Cleaner Designed to Operate on Water Power and to Discharge into Sink or Bathtub

ONE FISH EGG IN EACH CELL

The incubation of fish eggs in open water is said to be exceptionally easy with either the cement or metal cel-



Only One Fish Egg is Placed in Each Cell
of This Metal Frame



Cement Incubating Frame Designed to Hold One Egg
in Each Cell

lular frame here shown. Each cell or division holds but one egg, thus the eggs do not come into contact with each other, and it is unnecessary to remove the dead eggs, which is the most troublesome part of ordinary incubation. The cement frames are made to accommodate 100, 250, and 500 eggs, and the metal frames from 500 to 1,000 eggs.

A QUESTION OF RESIDENCE

The action of an English tax assessor has drawn attention to the rather remarkable case of an American who has made his home for the past 20 years in a yacht anchored about 200 yd. off Brightlingsea. The man is M. Bayard Brown, and his yacht is the "Valfreya." Banked fires are kept night and day, and a crew of 18 men keep regular watches, but the order to put to sea has never been given.

The tax assessor has brought action to collect an income tax on an assessment of \$50,000 a year, the contention being that Mr. Brown virtually resides in England. Mr. Brown, however, whose generosity has made him very popular with the people of Brightlingsea, contends that he is a citizen of the United States, all his income is derived from there, and that he has never paid harbor dues, rates, or taxes.

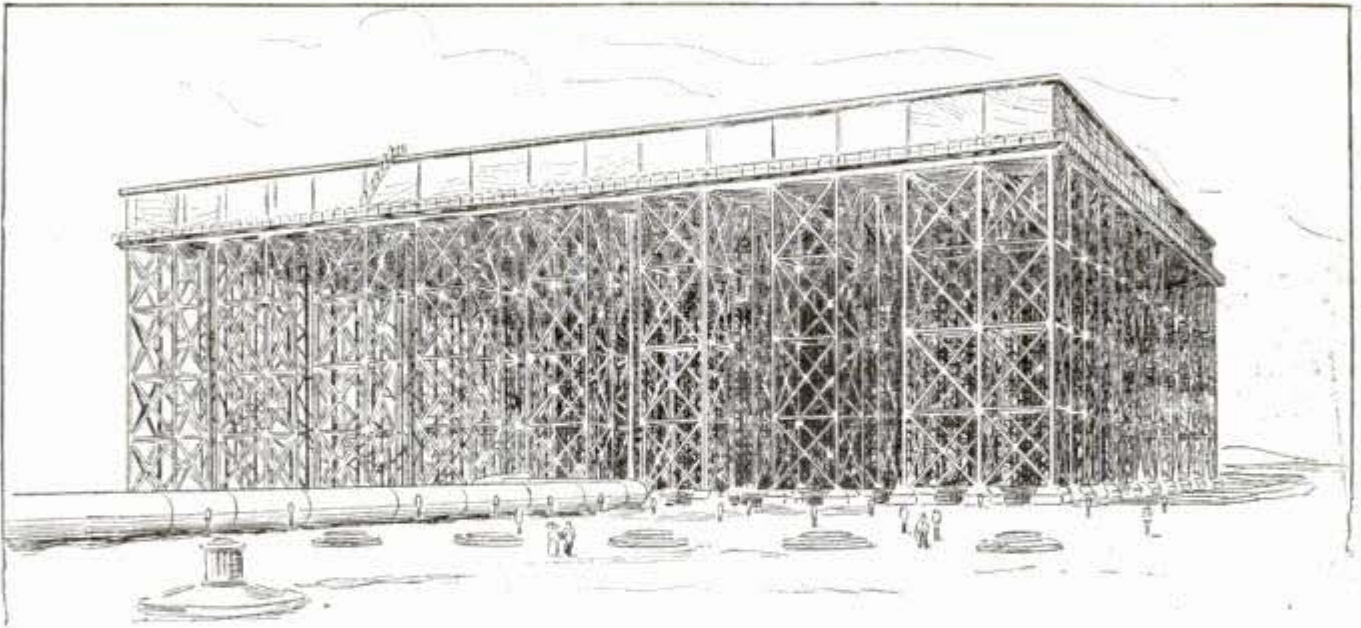
ELECTRIC FREIGHT TRAIN FOR ORDINARY ROADS

An electric train of six road wagons coupled with and preceded by its own self-propelled traveling power plant is illustrated and described in a German contemporary, although no information is given as to whether the system has actually been employed in practice by any firm of carriers for the transport of freight by road.

The power-generating wagon is equipped with two dynamos driven by gasoline engines, and an electric motor is provided for driving each of the two axles. The six trailing wagons have a capacity of from 5 to 5½ long tons each, or a total of from 30 to 33 tons, and the speed of the train is given as from 7½ to 9¾ miles an hour. Each of these wagons has also two driving motors, one for each axle, so that all of the axles throughout the train are electrically operated. The tires of the vehicles are very broad so as to enable the train to travel over practically any kind of road, and the cost of operation is said to be very low. The train is steered from the driver's wagon.

HUGE WATER TOWER HOLDS 9,000,000 GALLONS

The gigantic water tower or raised tank, erected as a retainer for the filtered water supply of Calcutta, India, is said to have the largest capacity of any water tower in the world. The



The Gigantic Raised Water Tank for the Filtered Water Supply of Calcutta, Which Has a Capacity of 9,000,000 Gallons

tank, which is 321 ft. square and 16 ft. deep, has a capacity of 9,000,000 gal., and is supported by 288 steel columns arranged in groups of four. The height of the tank from the top to the ground level is 110 ft. It is divided into four equal compartments by cross frames, and each of these compartments can be used independently of the others, so that any one or more compartments can be thrown out of service at any time, for repairs or cleaning.

Owing to the limited bearing capacity of the silt underlying Calcutta, the structure was built upon a monolithic bed of concrete, weighing 26,000 tons. The tank itself weighs 10,000 tons, and the weight of water when the full capacity is carried is 45,000 tons. As a precaution against the action of earthquakes, the supporting columns, although in groups of four and braced, are not interbraced, the object being to prevent excessive vibration and to provide a certain flexibility.

ARTS-CRAFTS MANTEL CLOCK

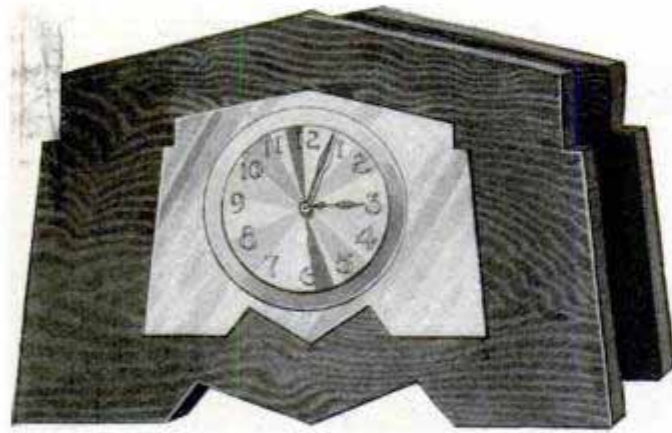
The clock shown in the illustration was designed especially for rooms furnished in mission style. The clock, however, may be made of mahogany or other wood to match the furniture in any room where it is to be placed. If the mission effect is desired, an oxidized or copper sash should be used. Movements can be bought at the sales-room of a clock company. A movement should be selected that is wide enough from the front to the back to allow the clock case to be made sufficiently deep for standing without being easily upset.

Quarter-sawed white oak is the best material for this clock, but any other wood which works easily and takes a

stain well may be used. Two pieces $\frac{3}{8}$ in. thick, $6\frac{1}{2}$ in. wide, and $8\frac{1}{2}$ in. long, will be needed for the front and back. One piece, 5 in. wide, 6 in. long, and with a thickness sufficient for the clock movement, is needed for the middle part. The thickness of this piece depends on the movement secured.

After the front and back pieces are finished, and a piece of hammered copper screwed on the front as shown in the drawing, the middle piece must be made just thick enough to make the whole distance from the front of the copper to the back of the clock equal to the depth of the movement. Plane one edge on both front and back pieces.

Lay out the design and the centers for the circular holes from this planed edge. Use a plane and chisel to cut the outside design. The hole can be bored out with an expansive bit, or



Mantel Clock Complete

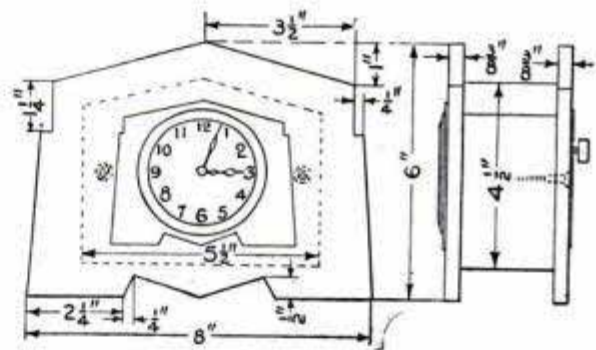
sawed out with a scroll saw, and filed perfectly round with a half round wood file. The bit will give the best results. If the bit is used, bore holes in a piece of scrap wood until the exact size is found.

The outside design of the piece of copper is made to correspond to the design of the clock. The circular hole in the copper can be cut with the expansive bit by first punching a hole in the center to receive the spur of the bit, placing on a block of wood and boring through a little way. The spur on the cutter will cut out the copper. Fasten the copper to the front with copper nails or round-headed screws.

If good glue can be had, the three

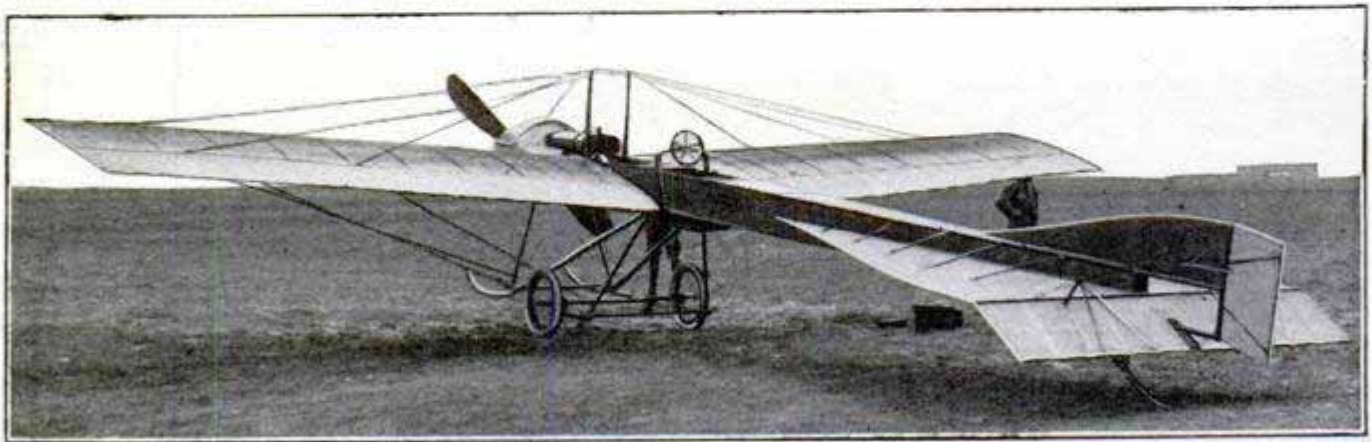
pieces of wood may be glued together. If the glue cannot be relied upon, put in two flat-headed screws from the back.

The clock can be finished with a dark stain and waxed, or, as it is small, it can be easily fumed. If stain is used, stain and wax the pieces before putting them together. The fuming process is more easily done after the clock is assembled. Secure a bucket, a peck measure, or any receptacle large enough, when inverted, to put over the clock. Pour about 2 oz. of strong ammonia into a saucer or small pan. Support the clock above the saucer and cover both with the inverted bucket. Allow it to stand for three or four days—the longer it stands the darker the fumed finish will be. Finish with two coats of bleached wax. Do not use ordinary uncolored wax, as it will show



Details of Mantel Clock

in the unfilled pores of the wood. The works of the clock should not be in the frame while fuming.



LATEST MODEL OF THE DEPERDUSSIN

This machine has been prominent at all the recent European aviation meets. The arrangement of the tail planes is unique

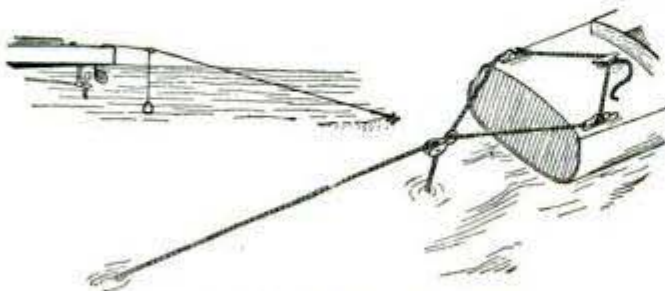


Removing Tooth Paste from a Tube

After squeezing out the desired amount of tooth paste from a tube, it very often makes a mess when the cap is screwed down on the surplus paste. A good way to avoid this is to press on two sides, in the usual manner, to get the paste, then change the position of the fingers to the ridges made by the first pressure and give it only a slight pressure. This will draw the paste down from the opening and leave a clean top.—Contributed by I. B. Thompson, Harrow, Ont.

Anchoring a Motorboat

A motorboat anchored in deep water at a distance from the shore can be reached only by using a rowboat or wading. I overcome this objection by anchoring my boat as shown in the illustration. The anchor line is not attached to the boat, but is passed through a pulley, as shown, and a weight tied to the end of the line. All that is necessary to bring in the motorboat is to pull in on the bow line and the weight will rise and let the boat

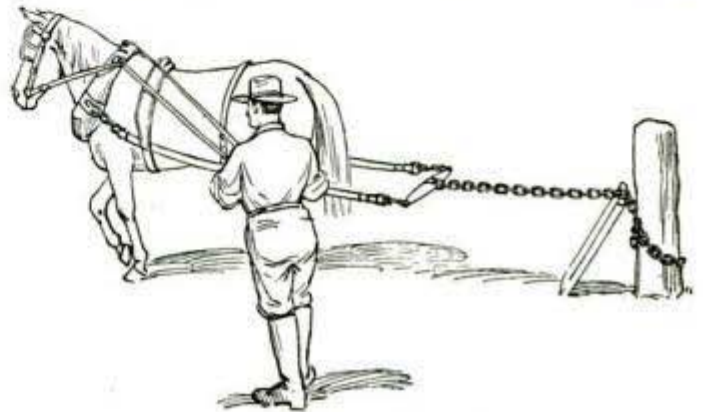


Boat Anchored in Deep Water

come to shore. When released, the weight will pull the boat out into deep water.—Contributed by W. W. McLean, St. Louis, Mo.

Pulling Posts

The device shown in the sketch is very simple for pulling old posts, but it works as well on any post. A plank, 2 in. thick, 6 in. wide and 3 ft. long,



Manner of Attaching Chain

is set slanting against the post and a chain is fastened around the post just above the ground and run up over the end of the board. A horse hitched to the end of the chain can pull out any ordinary post.—Contributed by Harry E. Wells, Scottsburg, Ind.

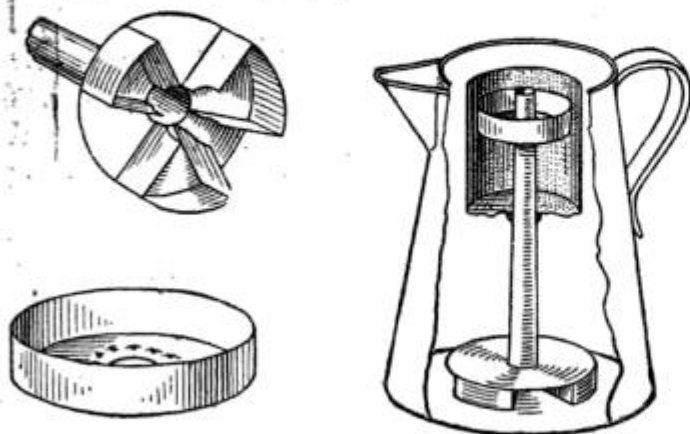
Killing the Grass Jigger

Outside workmen in the summer who are annoyed by the grass jigger, a skin-burrowing insect, can find relief by bathing or sponging the body in a solution of a few ounces of sodium sulphate added to a gallon of water. This kills the summer pest and is good for the skin. The sulphate of soda can be purchased cheaply at any drug store.—L. W.

CA substitute file brush can be made of a piece of soft wood cut to a wood-chisel edge. The dirt and filings are pushed out of the file with the edge.

Fountain Percolator for a Coffee Pot

The construction of the base of the fountain is shown in the upper left corner of the sketch. It is made of a heavy, pressed tin cup which has radial



Parts of the Fountain

partitions soldered in place and alternate parts removed to make openings for the water to enter.

The large end of a tapering tube is soldered into the center of the tin cup. The tube should be $\frac{3}{8}$ in. in diameter at the bottom and tapering to $\frac{1}{2}$ in. at the top. An ordinary percolator is placed on the tapering tube at the top and a small receptacle, made of a can cover, slipped on the tube within the percolator. The bottom of the can cover is perforated by driving a sharp-pointed nail through the metal from the under side.

When the water begins to boil it flows through the tube, pours over into the small cover, drips through the small perforations, and then trickles through the coffee in the percolator. The water is slightly cooled below the boiling point before coming in contact with the coffee, and the conditions are provided for making perfect coffee.

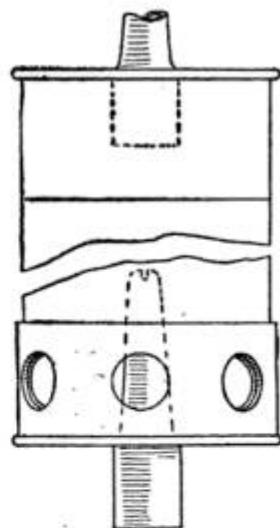
Boiled coffee is a decoction and harmful. Good authority condemns a coffee pot in which the grounds are held in the infusion, thus the "two-story" coffee pot is desirable. After the water has come to a boil and has had time to circulate about three times, the percolator with the grounds is removed. The coffee can be kept at

a boiling point after the grounds are removed without harm to the flavor.

Instead of the percolator, a cheese-cloth bag may be used to hold the coffee. In using a bag, the center tube is bent at the top and arranged with a spout, upon which the bag is tied or hung so that the water circulating through the tube pours through the bag of coffee. The bag should be washed in cold water and quickly dried, and a new one provided at the end of each week. The bag should never be placed in soapsuds for cleaning, as this ruins the flavor of coffee.—Contributed by W. R. I.

Bunsen Burner Made of Metal Shot Shells

Two shotgun metal shells and two brass gas tips were used in making the Bunsen burner illustrated in the sketch. The shells were drilled through the primer hole to make a hole slightly smaller than the gas tip so as to make a force fit. The gas tip was forced into this hole until the shoulder fitted closely to the bottom of the shell. The shell which forms the cap is slightly enlarged so it will fit snugly over the other shell. This shell should be cut off about $\frac{1}{2}$ in. from the base.



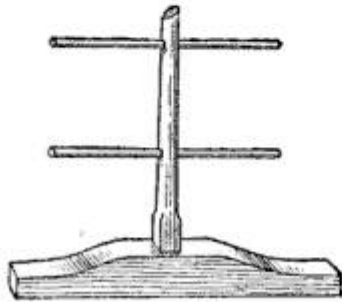
The expanding is accomplished by holding a round piece of steel in a vise and placing the short shell on it and hammering it lightly all around on the metal.

The tip which is put into the cap shell is pushed through from the inside. The air-controlling ring is made from a part of the upper shell which is cut off and also slightly expanded so it will turn easily on the base shell. Six

$\frac{3}{16}$ -in. holes are drilled through the ring and shell. By turning the ring, the air is regulated. All the material on the inside of the upper gas tip is removed and the lower tip used as an ordinary tip. The burner will produce a very hot, blue flame.—Contributed by Andrew Smith, New Haven, Conn.

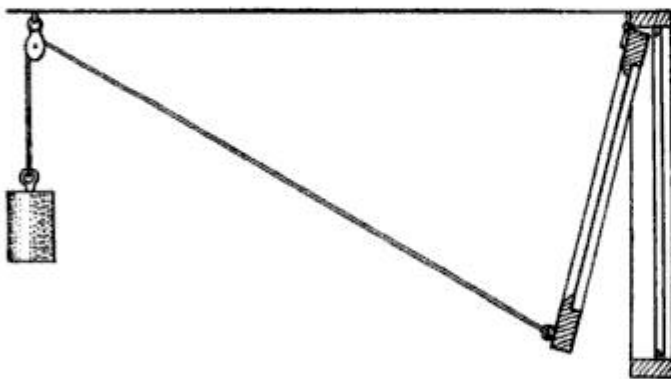
An Orchard Ladder

The upright of this ladder is a round pole of any desired length, with rungs driven in holes bored through its diameter. A nail is driven through the pole and rung to hold them in place. The pole is tenoned to fit into a foot made of a 4 by 6-in. piece of wood, 2 ft. long. The advantage of this ladder is that it will stand against a limb of a tree without turning.—Contributed by F. M. J. Berchmans, Scio, Oregon.



A Cellar Window Weight

The inconvenience of having to prop open a cellar window may be easily remedied by weighting it as shown in the sketch. The weight may be made of concrete, using a can as a mold. A piece of window cord (or small rope)

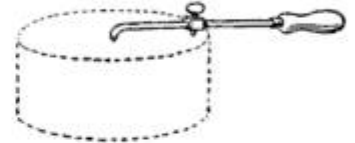


Weight Applied to a Window

and a small pulley comprise the rest of the apparatus.—Contributed by Fred V. Brook, Ardmore, Pa.

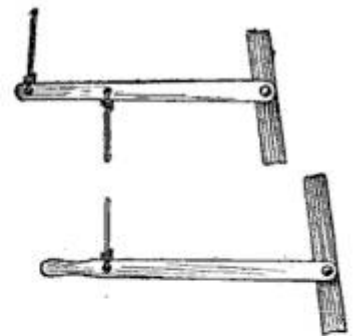
Can Opener

Some people find it extremely difficult to manipulate an ordinary can opener, so the invention illustrated is sure to be welcomed. It consists of a steel rod, bent and sharpened at one end, with a cutting attachment in the middle. The cutter is a small square of steel with a sharp point, which can be moved to any desired point on the rod and secured in position by the screw on top. To open a can, a hole is made in the center with the bent point, the cutter is pressed into the can top after setting it to the desired radius, and the opener run around the can by rotating the handle while pressure is applied to keep the device in position.



Double Levers for a Windmill

Some windmills have a very long pull of the operating wire to start or stop them, necessitating a very long lever at the base which is inconvenient, but this objection may be overcome by the double lever as shown. This consists of an ordinary lever about halfway up the tower, to the middle of which the wire from the lower lever attaches, thus requiring but a short pull on the lower lever to stop the mill.—Contributed by Thos. L. Parker, Olaf, Iowa.



ⒸThe shine on clothing may be removed by rubbing lightly with a piece of sandpaper.

ⒸA mechanic's finger nails can be kept from splitting and breaking by applying olive oil once or twice a day.

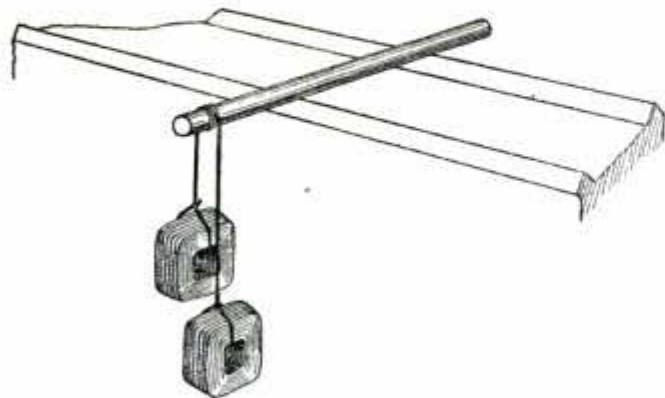
A Home-Made Filter

A break in the intake pipe of a water supply for a large city allowed considerable dirt to get through to the house faucets. One citizen procured clear water through a filter he made at practically no cost. He used a large flower pot with a drip dish from a small flower pot covering the hole in the bottom. The bottom was filled with clean sand and charcoal as shown in the sketch. An enameled utensil was used to catch the filtered water.—Contributed by J. E. Noble, Toronto, Can.



Weighing without Scales

When winding a field coil one day, I found my weighing scale broken so I could not determine the weight of the coil, and my winder ran too fast to count the turns. I wound what I judged to be more than necessary on the new coil, and then, taking a piece of string about 3 ft. long, I tied the old coil to one end and the new one to the



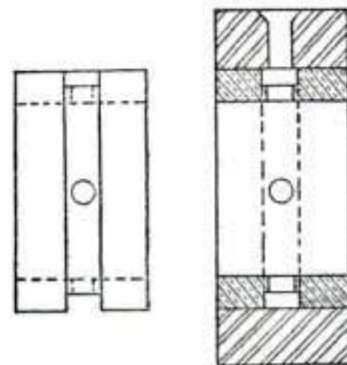
Substitute for a Scale

other. I then placed a short piece of $\frac{1}{2}$ -in. shaft on the ways of the lathe,

first making sure that it was level, and hung the two coils attached to the string over the shaft, one on each side. The new coil proved to be the heavier, causing the shaft to roll along the ways in its direction. It was only necessary to take off wire from the new coil until the piece of shaft remained stationary, and the coil was finished.—Contributed by H. L. Davies, Duluth, Minnesota.

Oiling Bushings

Small bushings are apt to loosen and turn, and then, if there is an oil hole for lubrication on the casting of the machine, the oil hole through the bushing for pin lubrication is useless. On a certain part of locomotive assembly there is one of the above class of bushings, which often turns, and by blanking the oil hole, becomes useless and dangerous. The sketch shows how the bushing can be machined so that it will take oil, even though it may have turned. Four holes are drilled, one lining with the hole in the strap, and before taking the bushing from the lathe chuck, a groove is cut through the ends of all holes and lining with the hole in the strap. In case the bushing should become loose and turn, it would still get plenty of oil and not be dangerous.



Cutting Glazed Tile

The owner of a house, who wishes to keep his residence in good repair, often finds that he must reset loose tile and replace cracked ones. This is quite a difficult job for an inexperienced person for the tile must be reduced in size. This can be accomplished by filing or grinding them on an emery wheel, but a better method is

to use an ordinary glass cutter on the glazed side where the tile is to be cut and then break off the part to be removed with parallel-jaw pliers. To cut the tile in half, use the glass cutter as mentioned above and tap gently on the under side with the sharp edge of the hammer face.—Contributed by Max Wolfsteiner, Washington, D. C.

Cutting Square Threads

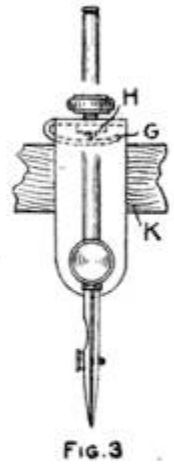
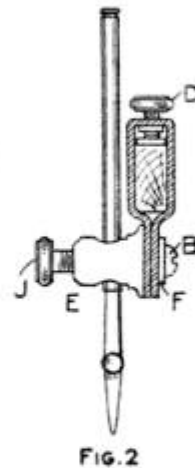
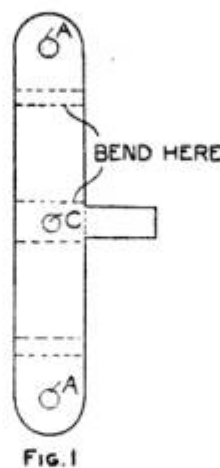
Here is a trick in cutting square threads in a lathe that is worth knowing. With an ordinary V-shaped tool cut first a thread of the proper lead that will be equal in depth and width to the cut of the finished square thread. Then follow down with the regular square tool. This relieves the square tool of a considerable part of the work and makes it cut a divided or broken chip, which is easy both on the tool and the work. In any thread-cutting, use a roughing tool first. If more than one piece is to be threaded, rough first and then finish. This keeps the good tool sharp and gives a nice finish. Speed up the roughing tool and let it dig out the metal, disregarding the finish.

Penholder for a Beam Compass

A simple and inexpensive beam-compass point is shown in the sketch. The construction of this instrument is such that almost any one can make it with few tools and little material. The finished instrument can be used either with a ruling pen, pencil or steel point by simply releasing the thumbscrew and inserting the desired article.

A small piece of 16-gauge sheet brass is cut to the shape shown in Fig. 1 and bent on the dotted lines. The holes AA are for the purpose of admitting the machine screw B, Fig. 2, and the hole C, Fig. 1, to admit the thumbscrew D, Fig. 2. These holes are not threaded but are made just large enough to let the screws pass through freely. Bend the brass to shape as shown in Fig. 2. Procure a brass binding-post, E, such as is used

for electrical work, and make the hole for the pen or pencil at least $\frac{1}{4}$ in. in diameter. Fasten the binding-post as



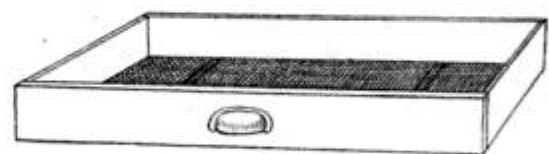
Holder Made of Sheet Metal

shown, placing a metal washer, F, between the head of the screw and the brass.

Procure a thumbscrew, D, Fig. 2, and a square nut, H, Fig. 3, of the same thread, making sure that the nut is large enough to keep it from turning in the space it is to occupy. After putting these together as shown in the drawing, the end of the thumbscrew D, Fig. 2, should come in contact with the strip of brass G, Fig. 3, and by turning the thumbscrew, it makes the brass strip bear upon the beam K, thus clamping the whole in place. Place the ruling pen or pencil in the hole provided and, after clamping it with the thumbscrew, the instrument is ready for use.—Contributed by Ray C. Cavell, San Diego, Cal.

Wire Mesh Drawer Bottoms

The ordinary bench drawer soon collects considerable litter and if not cleaned often it presents an untidy appearance. In building the drawers for



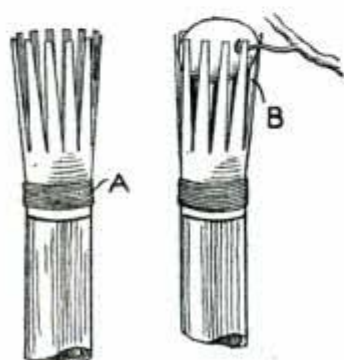
Mesh Applied to a Drawer

my shop I made the sides and ends of $\frac{7}{8}$ -in. material and then I used galvanized wire netting for the bottoms.

Two strips were put in the bottom to hold the wire in place, and the edges were turned up on the sides and fastened with tacks. Such a drawer will hold articles, but the dirt will sift out.—Contributed by C. H. Mount, Galesburg, Ill.

Picker for Small Fruit

The picker is cut on the end of a bamboo cane as shown in the illustration.

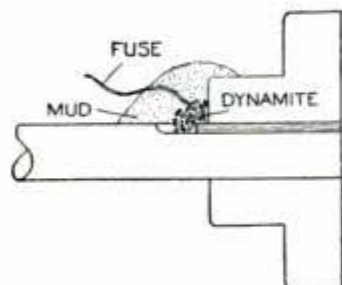


A cork is inserted on the inside and pushed down below the cuts and then the cane is wound with wire tightly at the place marked A to keep it from splitting.

To pick figs or other small fruit, simply insert the stem of the fruit in one of the slots B and push upward on the cane with a slight twist. The fruit will fall into the opening of the cane without being bruised.

Removing a Key with Dynamite

Two machinists and a helper had worked almost all day trying to remove a coupling from a large piece of shaft-



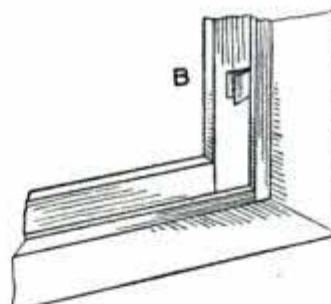
ing that had been out in all kinds of weather for several years. With some others I was working near them and as usual they were joked

about their inability to make a success of the job. When they said they did not have the proper tools, one man suggested using dynamite. Although intended for a jest they took him at his word, hastened away for the dynamite, and in a short time had the coupling removed.

They used about one-third of a stick of dynamite. The paper was removed and the loose dynamite pressed down into the keyseat over the end of the key and against the hub of the coupling, as shown in the sketch. A fuse about 18 in. long with a cap fixed on the end was pressed into the dynamite and the whole covered over with stiff mud. The fuse was lighted and we went away to a safe distance. After the shot we found that the coupling was almost off and it was only necessary to drive the key about $\frac{1}{2}$ in. to remove it entirely.—Contributed by W. A. Lane, El Paso, Texas.

Anti-Rattle Clip for Loose Windows

As I was annoyed by the rattling of a loose window sash, I picked up a

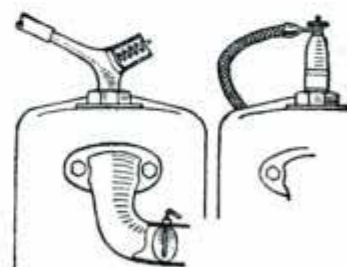


piece of sheet metal and bent it in the shape shown at A in the sketch. This converted it into a spring clip, which, when inserted between the sash and the frame, as shown at B, effectually stopped the rattling.

—Contributed by James M. Kane, Doylestown, Pa.

Filling Tires with an Automobile Engine

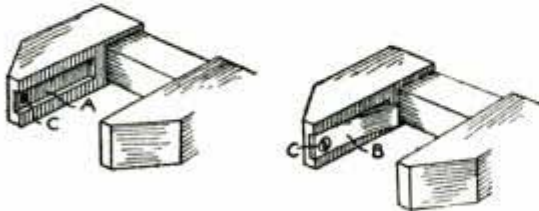
One of the cylinders on an automobile engine can be used to pump pure air into tires by using the attachment shown in the sketch. The device is made to take the place of the spark plug and consists of a poppet valve inlet and an outlet to attach to the air hose. A small shutter valve is placed in the mani-



fold, as shown, to keep out the gas mixture. The shutter is arranged to lock both open and shut.—Contributed by Paul Shrier, Paterson, N. J.

Nut Holder for a Monkey Wrench

The attachment for an ordinary monkey wrench shown in the sketch is for holding greasy and dirty nuts,



Spring in a Wrench Jaw

to hold them after they are turned from the threads and for starting a nut on a bolt without turning a few threads with the fingers. A groove, A, is cut in the stationary jaw and a hole, C, drilled and tapped for a screw. A spring, B, is fastened in the slot with the screw C. The spring holds the nut in the jaws until released.—Contributed by Irl R. Hicks, Hallsville, Mo.

Attaching Locomotive Jackets

The device shown in the sketch is for use in putting on locomotive jackets. As the jackets are made of very thin metal they are hard to get in place. The edges of the metal must be brought up together and buttoned or

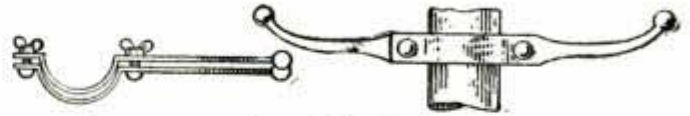


Clamps on the Ends of Sheet Metal

bolted, as the case may be, and the arrangement shown will do the trick. The part A is made to receive the links of a chain and the one shown in B is to hold the bolt end. The parts A and B are attached to the ends of a piece of sheet metal that is long enough to reach around the boiler. The sketch shows how the device is used.—Contributed by Urban A. Towle, Portland, Maine.

Clothes Hook for Tent Poles

A useful clothes hook for camp purposes is made to fold up, when not in

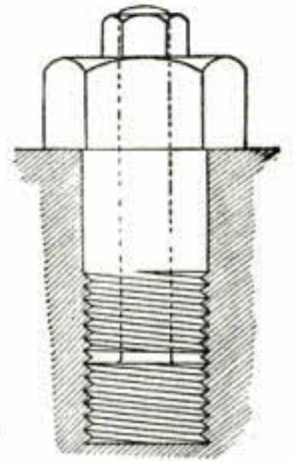


Tent-Pole Hooks

use, into a small space as shown. It fits around the pole of a tent and fastens with thumbscrews.

A Lock Stud Bolt

The lock stud bolt shown in the sketch is made in two parts, the first being the same shape as an ordinary stud bolt with a hole drilled through its central length, and the second made up of an end the same diameter as the first with a shank having such a diameter as to enter the hole in the first part. The shank has a fillet at the lower end so it will force the threads of both parts in opposite directions when it is screwed in place, thus locking them. A nut may be used on the outer end of the shank or it may be secured by a solid pin driven through a hole drilled in the shank.—Contributed by Oliver S. Sprout, Harrisburg, Pa.



Protecting the Edges of Chisels

The one who carries tools around considerably or who has a trunk chest with drawers that necessitates turning



Cover for a Chisel End

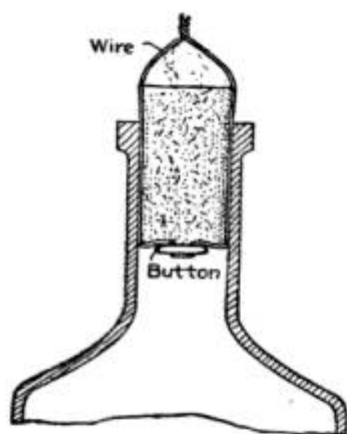
on its side to place the cover on, will find that the tools become badly

nicked. To keep from dulling them, provide caps for the chisels and cover the bit ends by turning a small disk of leather on the screw.

The chisel caps or covers are made of strong manila paper, wrapped around the tool end spirally and thoroughly glued as the wrapping proceeds. Leave the cap on the tool until the glue is thoroughly dry. Paint the outside with shellac, colored black.

An Easy Way to Remove Corks

When catsups, summer beer or grape wine is bottled, it is most convenient to seal each bottle as shown. Before



inserting the cork into the neck of the bottle, lace a large flat pearl button on a piece of wire about 10 in. long — the wire attached to ice-cream buckets is convenient for the purpose — then

place the cork into the loop and drive it into the neck of the bottle.

Have the two ends of the wire firmly twisted together at the top. Dip the whole cork, wire and all, into sealing wax or melted paraffin. When ready to open the bottle, knock off the wax, place a lead pencil under the wire, pull gently, and the cork is easily withdrawn. The button prevents the wire from cutting into the cork.—Contributed by Miss Margaret S. Humphreys, Mount Pleasant, O.

Truing Oilstones

An India oilstone was used to put the finishing edge on a certain special knife, made in lots of several thousands. The sides of the work had to be maintained almost flat, which made it necessary to true up the stones quite frequently to keep a true surface.

The stones were made level by holding them against the face of an emery wheel of the cylindrical ring form, which was run slowly for the purpose. This reduced them to a true flat surface. The grinding had, however, the effect of filling and glazing the face of the oilstone, something that involved a sharpening operation for which a flat metal surface, a sheet of emery cloth and a little kerosene were needed.

A stone was grasped in both hands and given a dozen brisk rubs across the emery cloth saturated with kerosene, and laid on the metal surface. The pores of the stone are thereby opened up, and the stone brought to the finest kind of a cutting surface. This process has also the effect of giving a more perfect flat face on the sides of the stone. When not badly worn, and for sharpening purposes only, this latter process is all the stones require.—Contributed by Donald A. Hampson, Middletown, N. Y.

Cutting Keyways on a Lathe

The ordinary lathe can be used in an emergency for cutting keyseats in shafts. All that is necessary is to place the shaft between centers as shown in Fig. 1 and lock it so that it will not turn, set the thread screw on the carriage for a large thread and feed a specially made tool into the metal as the lathe turns. The locking device is shown in Fig. 2. The number of cuts taken will depend on the size of the lathe and keyway.

As the tool comes to the end of the

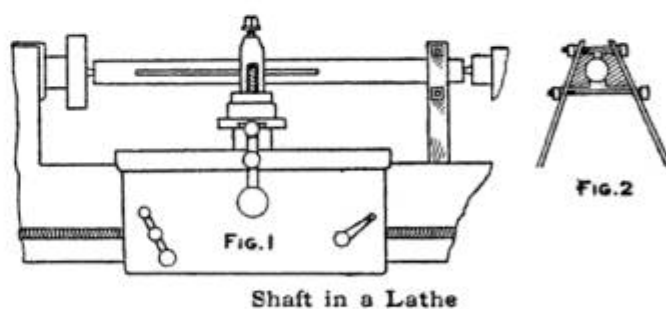


Fig. 1
Shaft in a Lathe

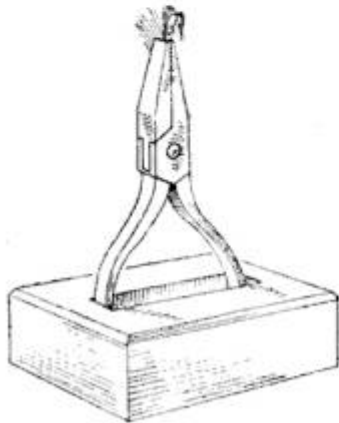
Fig. 2

cut it is only necessary to cut out the feed, run the carriage to the starting point and proceed as before until the

desired depth is attained. The width is regulated by the width of the tool. If a wide keyway is to be cut it is best to cut a narrow keyway first and finish with a tool of the proper width.—Contributed by J. F. Tholl, Ypsilanti, Mich.

A Fisherman's Fly Vise

Finding myself unexpectedly within reach of some decent fishing one day,



there was a question of tying some flies, and nothing in the way of a vise being procurable, necessity called forth the substitute described herewith, which will be of interest to others who

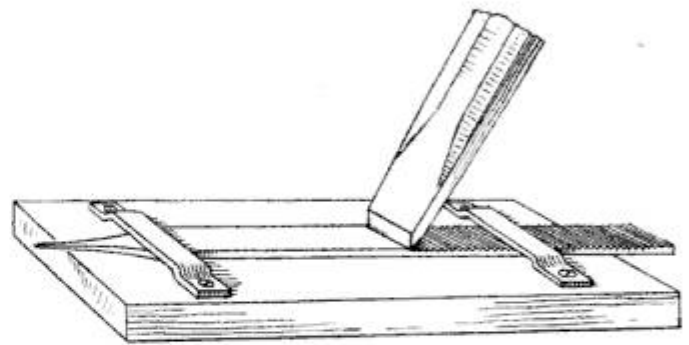
may be faced with the same difficulty, says a correspondent of the Field.

The apparatus consisted of a pair of flat-nosed pliers, which I carried in my tackle box, and a block of hard wood in which a slot was cut to take the handles of the pliers, so that when they were pressed in the slot the jaws would close tightly. This proves as easy to handle and as efficient as any fly vise I have ever used.

How to Make a File

Procure a piece of steel and forge it to the shape desired, then heat it and lay on a piece of hard wood. Allow the heat to imbed the metal snugly in the wood. Clamp one or two pieces of flat brass over the blank to hold it while cutting the teeth. Take a flat cold chisel of the right width and start cutting the teeth from the tip end of the file, always putting the cold chisel close to the tooth that was previously cut. When cutting a coarse file the chisel should be held at a greater angle, the blows of the hammer should be heavier and the cutting edge of the

chisel should be ground blunter than for making the finer-cut file. A very little practice will soon show the way

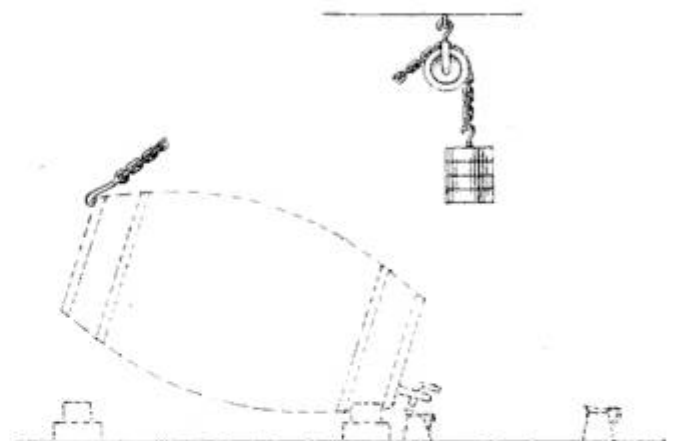


Cutting the Notches in Steel

of manipulating the chisel and hammer. Should the blank become bent in cutting the teeth, straighten it with a wood mallet. The file should be tempered quite hard.—Contributed by Chas. Bruderlein, New York City.

Tilting a Barrel

When the contents of a barrel reach a low ebb, the barrel needs tilting each time when more liquid is withdrawn. This disturbs the sediment, and the liquid comes out muddy. To prevent this, anyone with a few tools can make a tilting apparatus as shown in the sketch. A chain is hooked to the back



Weight Keeps Liquid Level with Faucet

of the barrel and runs over a pulley, bearing a weight at its other end. The pulley is suspended from the ceiling by two staples. As the liquid in the barrel becomes less the weight raises the barrel, the liquid thus coming out clear to the last.

New Method of Setting Commutator Brushes

A new and successful method of setting brushes, which does not require expensive instruments or special apparatus, is described by a correspond-



FIG. 1

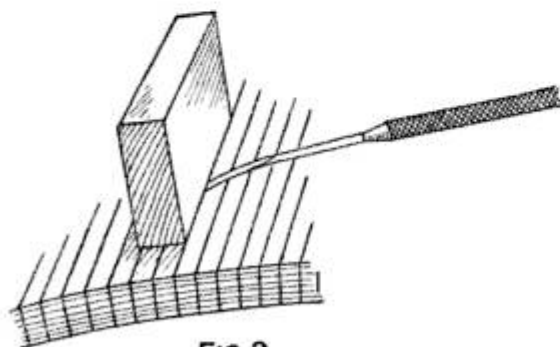


FIG. 2

Applying Wire to the Brush

ent of Power. All that is required is a short piece of No. 12 insulated copper wire from which the insulation has been removed for about 2 in. from one end. This end is flattened and tapered to a point, as shown in Fig. 1. It will be found convenient to bend the end backward as indicated. When the machine is running and carrying its regular load, the wire should be brought into contact with the commutator and carefully moved toward the brush until it touches it. Usually the toe of the brush is the edge which sparks, and this edge should be tested first. If the brush spits and glows when touched with the wire, the brushes are not on the neutral line corresponding to the load on the machine.

Both the toe and the heel of the brush should be tested and the yoke shifted until the glowing stops. The brushes on each arm of the machine should be tested. If some spark while others do not, this is an indication that the spacing is not right. If a position cannot be found where the glowing stops, it shows there is something wrong in the adjustment or the design of the machine. Small 500-volt ma-

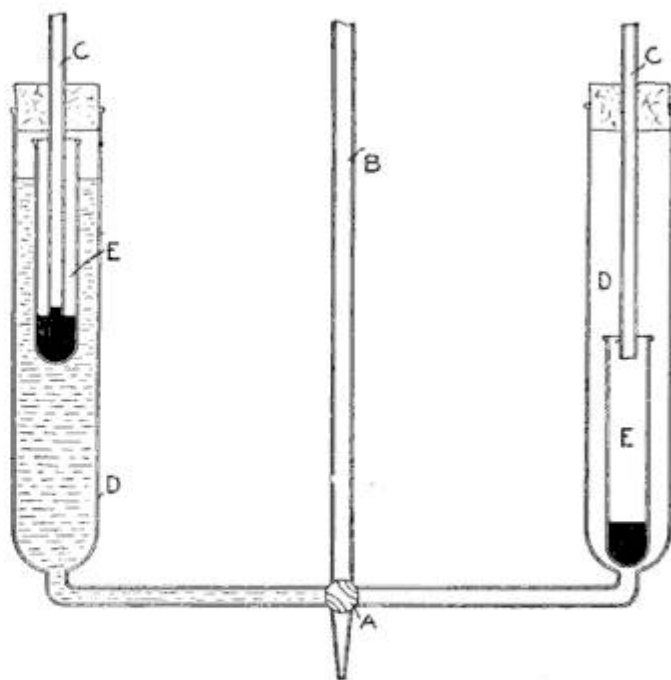
chines and machines having high commutator speed will always spark more or less under this test, but the sparking is very slight if the machine is in good condition, even when carrying full load.

This test is based on the fact that a copper wire, simultaneously in contact with the commutator and brush, provides a low resistance path between the two. The carrying capacity at the point of contact on the brush is low, so that if the potential is greater than it should be, enough current flows to heat this point to incandescence.

Measuring Liquids Automatically

In an analytical laboratory a certain amount of salt solution was used from time to time and as the operator did not care to take the time to stop and measure it out, he devised the apparatus shown in the sketch. All of the parts were made of glass, but could just as well be made of other material.

The flow of the liquid is controlled by a four-way valve, A, located at the intersection of the three tubes of which B is the tube from the source



Measuring Tubes with Valve

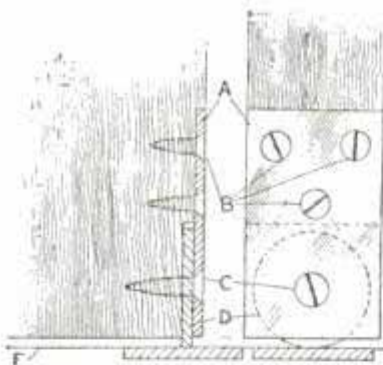
of supply. The air tubes C C are fitted tightly in the corks and also the corks in the tubes D D. The last named

tubes resemble large test tubes. Inside of the large tubes D D are small test tubes E E, each containing about a teaspoonful of mercury.

When the four-way valve A is in the position shown, the liquid from the supply pipe enters the tube at the right, which forces the test tube upward until it is in the position of the one shown at the left when the mercury seal stops further progress. While this is taking place the left tube, which has been previously filled in the same manner, is emptying into whatever receptacle placed beneath. The quantity of liquid is regulated by raising or lowering the tubes C C.—Contributed by W. F. A. McIntyre, New York City.

Preventing a Door from Sagging

The sketch shows how I fixed a sagging door to keep it from sticking at the bottom.



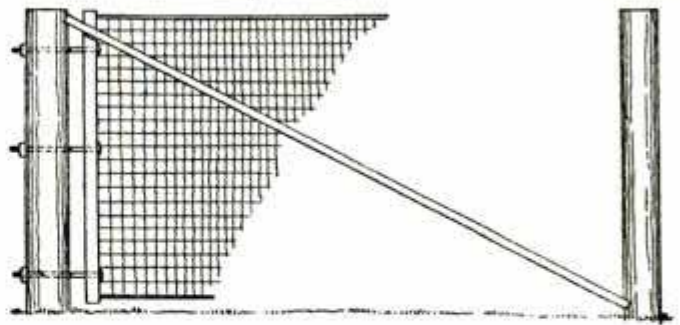
I cut out the corner of the door to receive a piece of metal, A, and a washer, D. The metal A was drilled a n d c o u n t e r-

sunk on the top end for three 3/16-in. wooden screws B, and a 3/8-in. hole drilled or the lower end to admit a larger screw, C, to hold the washer in place. The metal and washer were fastened to the edge of the door as shown, and a piece of metal set in flush on the threshold to support them. This is a good preventive for a door that is liable to freeze and stick at the bottom.—Contributed by Geo. Madsen, Chicago.

¶The lost motion in the steering gear of an automobile has led to many accidents. The wear will be detected by the wobble of the front wheels when passing over a rough road.

Keeping Poultry Wire Taut

Poultry netting will not always remain stretched the same as when first stapled to the posts, and for this reason



Stretcher Attached to Post

I made a tightener as shown in the sketch. The end of the netting was clamped between two boards, each 1 by 3 in. and as long as the netting is wide. Three 1/2-in. bolts, each 12 in. long, were flattened on one end and attached to the board at equal distances apart. The bolts were run through holes bored in the end post. The netting can be tightened at any time by turning up the nuts.—Contributed by Carl Lung, Cornelius, Oregon.

Soot Scoop for a Chimney

After removing the heating stove for the summer, the flue opening is covered with a round disk of metal having spring arms to hold it in place. The disadvantage of this device is that the soot gathers in the opening and falls out if the cap is slightly drawn away from its place. It is best to fasten the ends of the arms into the end of a piece of stovepipe and cut a portion of its top out as shown in

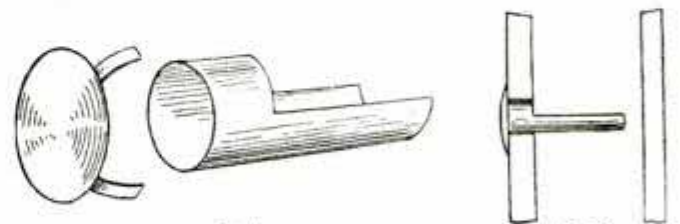


FIG. 1

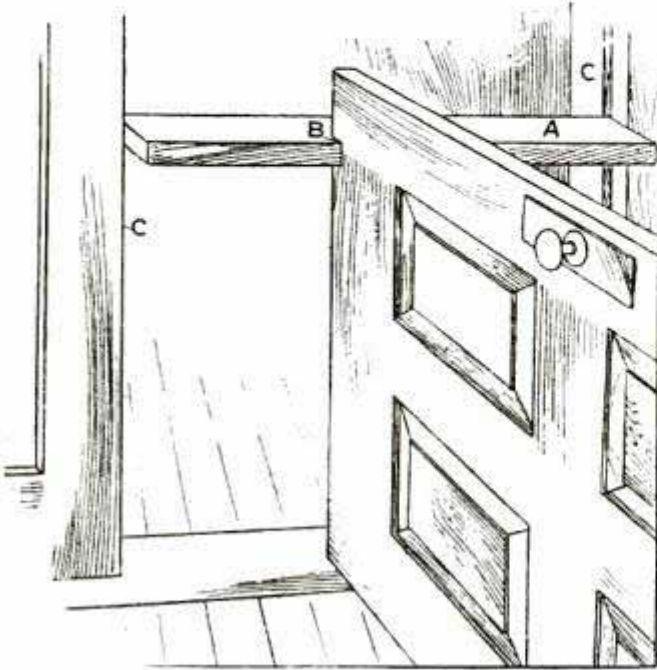
FIG. 2

Scoop for Catching Soot

Fig. 1. This provides a scooplke device, Fig. 2, that will catch all the soot and retain it when taken from the flue opening.

Holder for Jointing Doors

The sketch shows a good method of holding a door while planing the edges. When the time comes to fit the doors



Door in Holder

in a new house, begin with the widest door. Fit a board, A, in between the door casings CC, and cut a notch, B, in the center. The board A can be easily removed for testing the door in the opening. After the widest door is in place, fit the board to the next largest door opening, and so on until the smallest door is finished. This will make it possible to use only one board, A, as it can be cut down to fit between the casings of the smaller openings.

A Shrinking "Kink"

When shrinking a pulley, collar or ring on a shaft, it is well to have a shoulder to shove the ring up against for a positive stop. There are, however, cases where it is impossible to provide such a stop and where it is more a case of luck than anything else that the ring cools at the right spot, longitudinally, on the shaft. Lathe dogs are good for this purpose. The dog should be set so that when the ring butts up against it, it will be in the right location. But be careful not to put on a dog and find, after shrinking, that it is

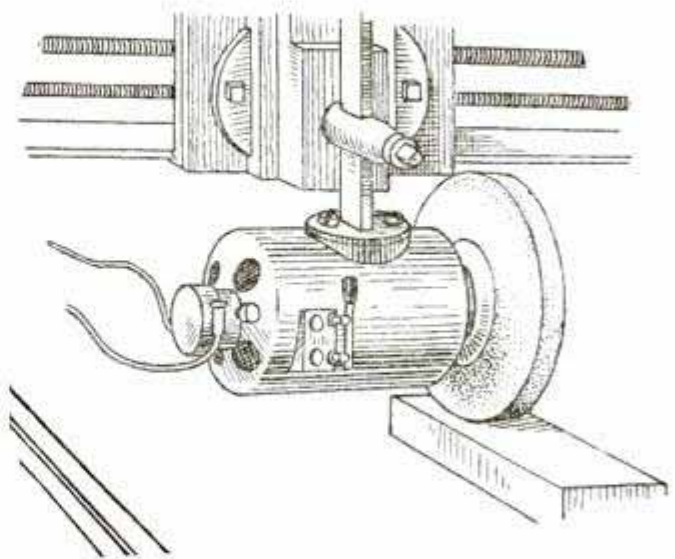
a prisoner between two rings or collars. More than one man has had to help himself out of such a hole by sawing the dog in two. Where such a thing occurs and the dog cannot be placed otherwise, use a regular split dog. It might be used in any case, for then no sawing or removing of newly shrunk pieces would be necessary.

Surface Grinding on a Planer

One factory, not large enough to warrant the purchase of a large surface grinder, says Factory, fitted up a small electric motor so that it could be used in a shaper or planer. In the factory a number of dies were made for the toy industry, the surface of the dies sometimes measuring 24 by 30 in. The small dies were machined on a shaper, the large ones on the planer, and after they had been hardened, there was no way to finish the surface.

To meet the requirements, the manager of this factory bought a 1/2-hp. motor and fitted it with a shank so it could be placed in the tool holder of the shaper or planer. The shank was welded to the plate and bolted to the motor as shown, then placed in the tool holder just the same as a regular cutting tool.

After setting the motor to the proper



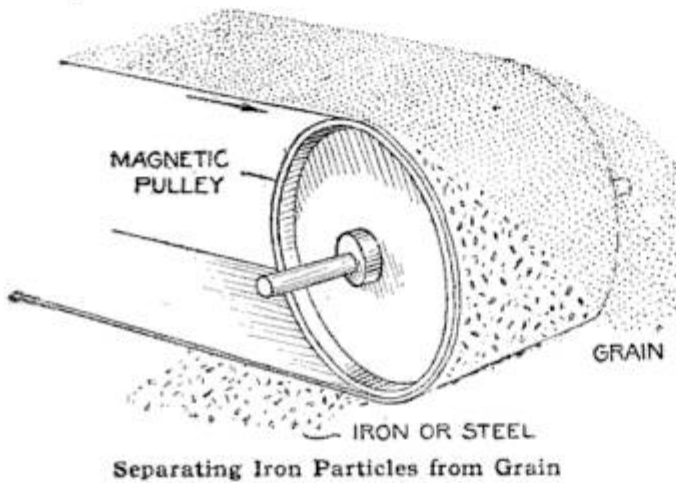
Grinder on a Planer Head

angle, the current was supplied to it by attaching a plug to the nearest lamp socket. The feed could be adjusted to

grind by setting the shaper or planer just as you would set it for the same purpose for an ordinary cutting tool.

Magnetic Separator for Grain

A magnetic separator for removing iron and steel from grain was recently described in an English journal. The separator consists of a steel pulley magnetized by a current of electricity run through coils placed within the rim. The belt conveyor running over the pulley carries the grain in the usual manner, but as the iron or steel particles reach the magnetic field, they are kept in close contact to the belt until



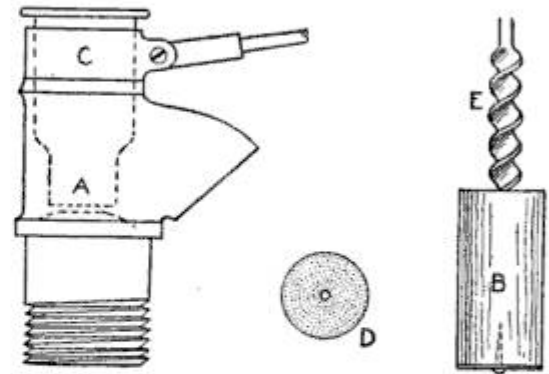
after it leaves the pulley on the under side. The sketch clearly illustrates the operation.

Grinding Valve Seats on Flush Tanks

Sometimes the interior valve seat A on a water closet flushing tank becomes corroded and rough after the tank has stood empty for a while and the seat requires grinding. In the absence of a lathe and proper tools, a simple tool for grinding such and similar interior valve seats, which are not accessible with ordinary tools, may be made by whittling a piece of hard wood, B, to such a diameter as to snugly fit the bore of the valve casing C, cutting it about 2 in. long. Tack a couple of pieces of emery cloth, D, to the end of the wood, or leather will do, with emery powder and oil used as an abrasive.

Place the valve seat casing in a vise

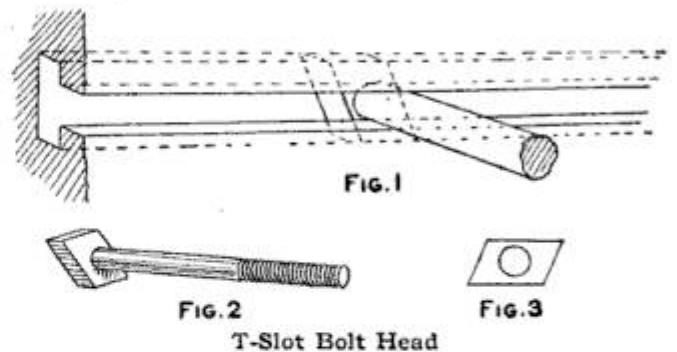
and turn the wood plug with a brace, the bit E having been previously set into the wood far enough to turn it. In cities where meters are used, the



amount of water flowing through for flushing may be cut down considerably by bending the float lever down sufficiently to cut off the supply valve when the flushing tank is about one-half full.

Bolt for T-Slot in Machine Tools

An ordinary square-headed bolt must be slid in from the end of a slot on machine tools, and if an intermediate fastening is necessary after the end bolts are placed, it is impossible to put an extra bolt in without removing the work. A bolt having a diamond shaped head should be made for this emergency. Such a bolt is shown in place in Fig. 1 and the shape of the

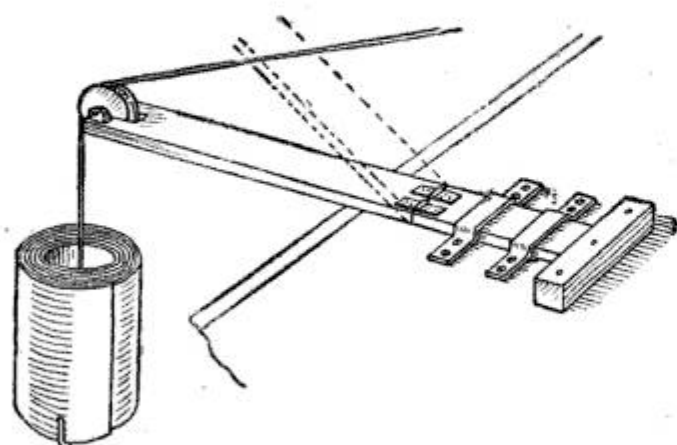


head in Figs. 2 and 3. The shape of the head prevents it from turning in the slot when the nut is tightened.—Contributed by Chester Purdy, Ghent, O.

A solution of 1 dr. sodium carbonate in 1 qt. of milk is a good cleaner for motor gloves.

Hand Hoist for Roof Workers

The sketch shows an important practical contrivance devised by a correspondent of Metal Worker to eliminate the friction produced when hoisting



Folding Arm on Roof

material up the side of a building, with the rope sliding along the edge of the roof. The dimensions given are: Roof piece, 3 ft. long, and the projecting part, 2 ft. long, 1½ in. thick and 6 in. wide. Two extra heavy strap hinges are used.

The projecting part is notched out at the end just enough to allow a heavy sheave wheel to pass in so that the axle can have sufficient support. The axle is held in place by straps bent to fit over it and screwed to the board by four wood-screws.

Instead of nailing the arm to the roof on every occasion of use, thereby filling it full of nail holes, two band-iron straps are permanently fastened to it by means of wood-screws. These straps are bent to the shape of the board, as shown, and nails are driven through the holes in the straps to the roof. As most of the stress is a backward push against the arm, it is well to nail a cleat to the back of the board.

The mode of operation is to lower the rope, and if it is a roll of tin being hoisted, to hook the rope on the tin as shown. By steady hauling, it will be found that the tin will be raised with surprisingly little exertion. This hauling is continued after the roll of tin strikes the wheel, for the main feature of having the arm hinged is to act like the boom of a derrick and raise the roll back on the roof.

Uses for Old Emery Wheels

Broken emery wheels should not be thrown away. There are many uses for them about the house or home workshop. Take pieces of different grades and grits; have a chunk as coarse as No. 40, a piece of No. 80 and a piece of No. 100 or 120, if possible. Every machine shop has broken wheels that can be had for the asking or at a nominal price, and they will save many a quarter in sharpening pocket knives, table hardware, scissors, pruning shears, hatchets, etc. For carpenters' tools, of course, a piece of grindstone is better than the machine-shop emery wheel, but soft, fine grades of the latter will do in a pinch. Automobilists will find a piece of emery wheel a pretty handy thing in their tool box for touching up commutator parts while on the road.

A Special Lathe Dog

Work being done on a lathe sometimes is continuously, or for quite a length of time, of the same nature. In removing the work from the centers for fitting or trying, much time is lost in removing the dog and again tightening it in place. A small piece of ¼-in. sheet iron or steel, cut and slotted as shown, and bolted to the faceplate through one of the slots will save much time. The work is driven as

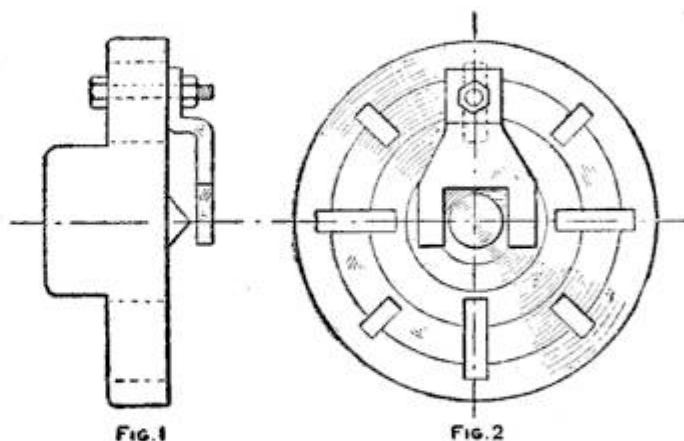


FIG. 1

FIG. 2

Dog Attached to Faceplate

well as with a dog and can be instantly removed and replaced without the time taken to remove a dog. A little time

spent in making a few of these with different sized slots will save the busy lathe man much time and trouble. For a rod bolt machine, it cannot be surpassed.—Contributed by F. W. Bently, Jr., Huron, S. D.

An Apple Picker

Apples for packing or for keeping any length of time should be carefully picked from the trees so they will not be bruised. As the climbing of the trees made the picking a tedious job, I devised a picker as shown in the sketch.



I took a pine stick, 12 ft. long, 2 in. wide, and $\frac{7}{8}$ in. thick, and hinged a 2-ft. length of the same material to its side so that the ends were even, and placed an old-fashioned half-round tin cup on each strip so that their openings would register. A

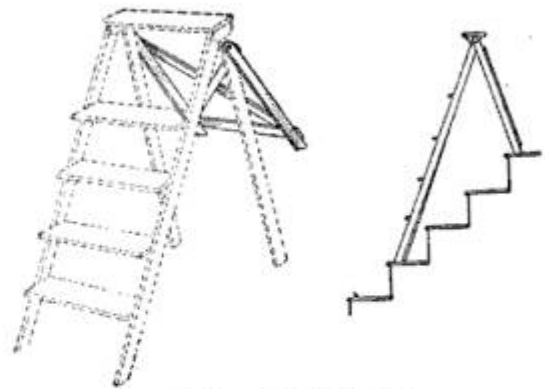
row of holes were punched around the edge so that a soft pad could be sewed in each cup.

A stout cord was attached to the short piece and run through a hole in the long piece allowing end enough to equal the length of the long strip. A piece of heavy clockspring was placed between the strips to keep them apart. The operation is obvious.—Contributed by W. D. Gay, Essex, Iowa.

Short Legs for a Stepladder

Make an attachment of the same stock and quality as the back support of the ladder and fasten it to the ladder as shown in the sketch. Use carriage bolts of the desired diameter and length, with the head on the inside and countersunk; put a washer and a nut on the opposite side and rivet the end of the bolt slightly so the nut will not come off. Use a good sash cord between the short legs and the main part of the ladder to keep them from spreading.

The length to make the attachment is easily determined by placing the ladder closed on any ordinary stairway



Legs Attached to Ladder

and measuring for the short legs. This attachment can be used on almost any stepladder.—Contributed by J. C. Polin, St. Paul, Minn.

Removing Dents from Automobile Brass Fixtures

Very often the automobile owner brings a brass lamp or a horn into the shop to have the dents removed. This is a very easy job, if a burnisher as shown in the sketch is used. The burnisher should be made of tool steel and highly polished after being hardened. A good many of the dents may be removed by placing a block of wood inside the article and tapping the outside with a wood mallet, but after this there still remain the fine wrinkles. These can be removed with the burnisher. Place a solid substance on the under side and with a little pres-



Burnisher

sure of the tool on the opposite side, the dents can be rubbed out. Tools of any desired shape can be made to fit the job in hand.

Do not throw away a leaky hot-water bottle or bag. Heat clean white sand in the oven and pour it into the bottle. Sand will remain hot longer than water.

Systematic Oiling of Automobiles

THOMAS P. HALLOCK

Working on the principle that an ounce of prevention is worth a pound of cure, I have devised an automatic reminder of the time and place to oil and grease my automobile that it may be kept in perfect running condition. The simplicity of my system is, I believe, its best recommendation and it could well be used in large garages—especially where motor trucks are kept—to prevent carelessness or forgetfulness on the part of chauffeurs and mechanics.

The extreme importance of proper lubrication of the many parts of the motor car is emphasized by the fact that one of the trade journals recently accounted for 14 locations for greasing and 28 locations for oiling a single type of car. During the course of one year, the author contended, 1,227 applications of oil and grease—in a regular succession of dates—ought to be made in these places.

I have found that the danger of running dry at any particular spot where oil should be applied does not lie so often in carelessness as it does in forgetting—though to forget is unquestionably evidence of lack of care in the business man of today. Next best to a perfect memory is a perfect system of memory aid. I could not decide to my satisfaction that the 1,000 or more applications of oil and grease would be faithfully given my car throughout the year, so I sought to simplify the problem by devising a schedule of oiling locations for certain dates in each week and month.

I took a large calendar and pasted at the top a diagram of my car, furnished by the manufacturer. On this diagram I marked—some manufacturers provide their diagrams already marked—each point where lubrication ought to be applied, and by a system of red and blue lettering I denoted whether oil or grease was the proper lubricant for this particular spot.

Then I made a schedule giving the name of each location prefixed with the red or blue letter which had already been assigned, and my key was complete. My next move was to begin with the first oiling date in the year, which I chose as Jan. 7. In the space where the figure representing this date was printed, for instance, I marked the following letters:

| Red | Red | Blue |
|-----|-----|------|
| B | S | A |
| C | U | M |
| F | W | R |
| G | Z | LA |
| J | AA | |
| L | CA | |
| P | GA | |
| Q | HA | |

This presented quite a bewildering appearance, but to me it meant quite clearly that on this date I should apply oil and grease as follows:

Red—Oil

B—Steering-knuckle bolts
C—Front-wheel bearings
F—Fan-bearing oiler
G—Starting crank bearing
J—Valve-rod guides
L—Shock-absorber studs
P—Commutator oiler and greaser
Q—Crank case filler and oil tank
S—Magnet oil cups and wells
U—Brake pedal bearing
W—Brake and gear lever ratchets
Z—Brake fittings and connections
AA—Plate clutch housing
CA—Gear and brake lever shaft bearings
GA—Shock-absorber bearing studs
HA—Differential housing

Blue—Grease

A—Front-wheel hub caps
M—Steering-cross-tube greasers
R—Steering-case greasers
LA—Rear axle outside greasers

Certain of these same operations must be repeated daily, others weekly, and still others semiweekly and monthly, but, no matter how often my attention is required to each particular lubricating location in my car, I am sure to be reminded by my faithful calendar.

Since systematic lubrication is unquestionably an insurance on the life of my car, I have not counted the short time lost that I spent in marking my calendar. Exactly the same system,

prepared to fit the requirements, could be used in a garage where several different types of cars were kept, and the results would entirely warrant the adoption of this practice.

Detachable Peach-Basket Handle

A peach basket is rather an awkward thing to carry because it has no handle. A handle that will do for all

sizes and kinds of baskets can be made as follows:



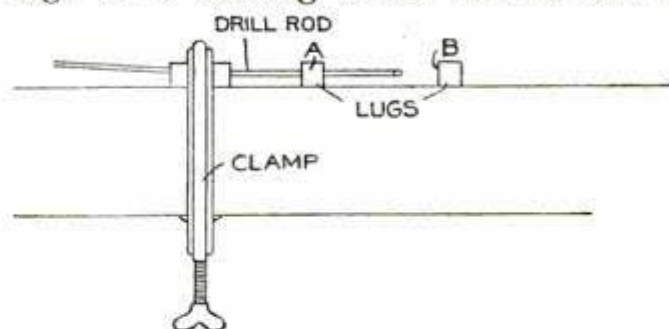
Procure the wood part of an old bucket bail and two pieces, each 3 ft. long, of galvanized wire and place them through the wood handle, allowing the ends to project evenly on both sides. Bend the ends as shown. Make two wire hooks and attach the ring of the hook in the ring of one wire and hook it in the ring of the other wire. This will spread the wires and give them stability while in use. When not in use the hooks can be unfastened and the handle brought into a smaller space. The turned-up ends of the long wires hook under the outside rim of the basket.—Contributed by Frank S. Henry, Hadden Heights, N. J.

Drilling Projecting Lugs

It often happens that one must drill holes that are so close to other parts, or have projecting parts in the way, as to make it impossible to get the chuck of the drill press or breast drill directly over the hole to be drilled. The usual way is to drill the hole on an angle and finish straight with a file, or to drill a larger hole than is necessary. Frequent examples of such holes are pin holes for doors on the side of machinery and other hardware products.

An alternate method is to use a length of drill rod formed into a drill point at one end and gripped in the

chuck at the other. This is illustrated in the drawing, where A and B are the lugs on a casting to be drilled for a



Grinding the Drill Rod

door hinge. Here a block is held on with a clamp and used for a guide for the drill rod. This block is first drilled the size of the rod and then countersunk at one end—the end the drill enters from the chuck. Sometimes two blocks are necessary. The drill should be supplied with lubricant at this point. Feeding must be done with care and not too fast or the rod will buckle.

Bracket Brace for a Sagging Door

Screen doors sagging on the opening side which causes them to rub on the floor as they are opened and shut may be repaired in the following manner: On the opposite side from the hinge and in the lower corner of the frame, place a small ornamental bracket which will not mar the appearance of the door and yet make it



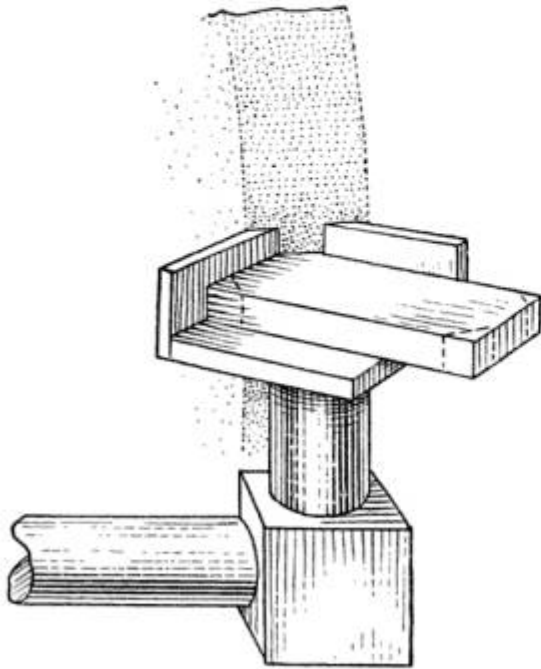
Bracket in Door Frame

perfectly rigid. Before placing the bracket, drive a small wedge under the door to hold it in the correct position.

⚠ Graphite should not be used on an engine timer as it will short-circuit the current.

Corner Grinding Tool

Several thousand rectangular pieces made in brass and steel had to be finished with the corners cut on an angle of 45 deg. as shown by the dotted lines



Tool Attached to Grinder

in the sketch. The way the corners were removed was by grinding, and the fixture used for holding the pieces to secure the proper angle consisted of an arm from the bracket for supporting the rest, both forming part of the ordinary grinder outfit.

A special rest was made by an upright having a surface square in shape and turned with one corner to the wheel. Two sides were attached to the square. A piece was placed on the flat surface and pushed against the turning wheel. The sides guided the pieces so that all corners were ground true.

Fluids for Drilling or Filing Glass

Several fluids are used in the operation of drilling or filing glass, of which vaseline oil and a solution of camphor in spirits of turpentine are the most general. A French scientist recommends a solution of 30 gr. of camphor and $1/5$ of a fluid ounce of sweet almond or olive oil in 7 fl. oz. of benzine. This mixture will not deteriorate, renders filing and drilling easy, and can be

removed from the glass by simply dipping the latter into benzine.

The vaseline oil is objectionable because it leaves the glass greasy, and the solution of camphor in spirits of turpentine, because of the disagreeable smell.

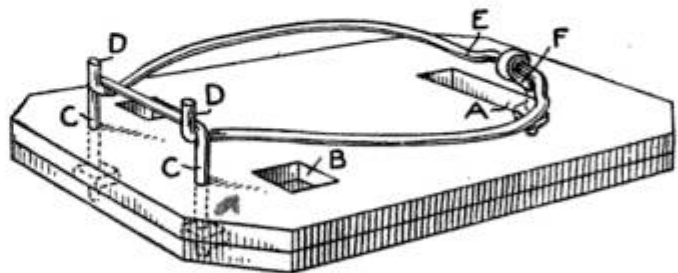
Repairing Broken Cogs in Pattern Gears

A good way to repair broken cogs in small wood spur or bevel-gear patterns without putting in new ones is to use a stiff paste of litharge mixed with beeswax. Drive some brads part way into the place to be built up, keeping their heads slightly below what will be the finished surface, and apply the mixture. When this gets hard, it can be shaped with a knife or chisel and sandpapered. If a coat of shellac is applied to such a cog, it will not stick in the sand.

Horseshoes for Marsh Land

Fit up the ordinary horseshoe with toe and heel, throwing the heels well out, says the Blacksmith and Wheelwright. Make the bottom of the marsh shoe of two thicknesses of $1/2$ -in. hard wood, crossing the grain of the boards to prevent splitting. Slots A and B are cut for the toe and heel calks to rest in. This will prevent the marsh shoe from slipping around on the horse's foot.

Make a staple of $3/8$ -in. round iron and thread each end about 3 in. long.



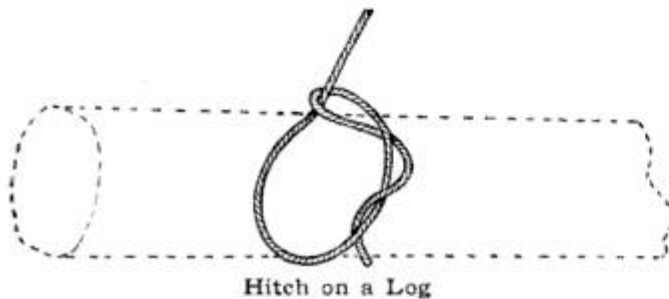
Marsh Land Horseshoes

The width of the staple will depend on the width of the shoe. The staple is fastened to the board by inserting the ends through holes bored at CC.

Bend another piece of $\frac{3}{8}$ -in. round iron E in the shape shown to fit around the horse's foot about 2 in. below the hair. The ends DD are bent up to fasten into the staple. Forge an eye on a bolt to fit over the rod E and attach to the board at F.

A Timber Hitch

One of the most useful and easily tied and untied hitches or knots made with a rope is shown in the sketch. This tie is used extensively by sailors, but is little known among landsmen. It can be used for hoisting timbers, logs, boxes, barrels and in fact any



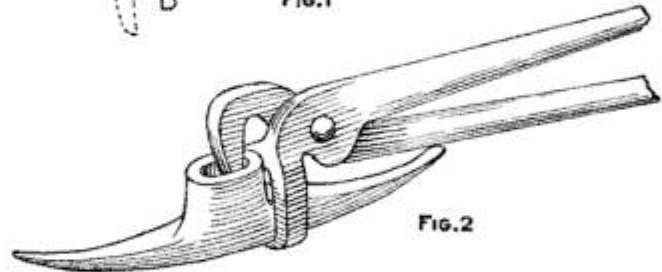
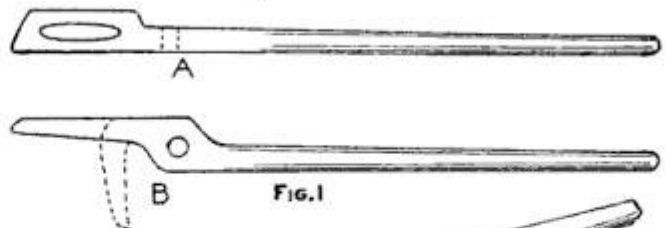
article that a loop can be placed over.
—Contributed by L. A. Gardner, Oakland, Cal.

Tongs for Handling Picks

In piecing picks with steel, when they have become too short and are worn down, a common pair of tongs will not hold them steady, and they will slip back from the taper on the pick while it is being hammered, says the American Blacksmith. A pair made like those shown in the sketch will give satisfaction, as it will hold the pick firmly and securely, no matter how much hammering is done on the metal.

The lower part of the tongs in the jaw part are first made in a ring (A, Fig. 1), which should be large enough when closed together to form a rectangular opening through which the end of the pick will pass all the way up to the eye. This is bent down at right angles and the other part, B, is forged as in the ordinary pair of tongs, after which it is bent down to go inside of

the eye of the pick. The manner of holding a pick is shown in Fig. 2. The



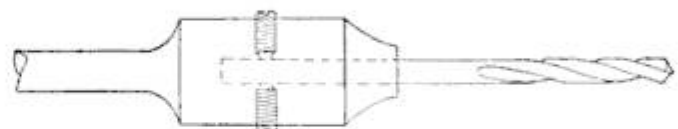
Pick Tongs

smith who has much of this kind of work to do will be well pleased with a pair of these tongs.

Holder for Broken Drills

The accompanying illustration shows a design of a holder for broken twist drills. The hole is bored the size of the drill and setscrews with rounded points are placed opposite each other. These enter the flutes of the drill and make a positive drive. The other end of the holder is turned to fit the chuck.

These holders soon pay for their making. In one instance, a new high-speed drill, costing \$2, was broken off by carelessness right at the end of the flutes. If it had not been for the holder made for the drill, it would have been worthless, as when broken it would not run true or positive enough for the



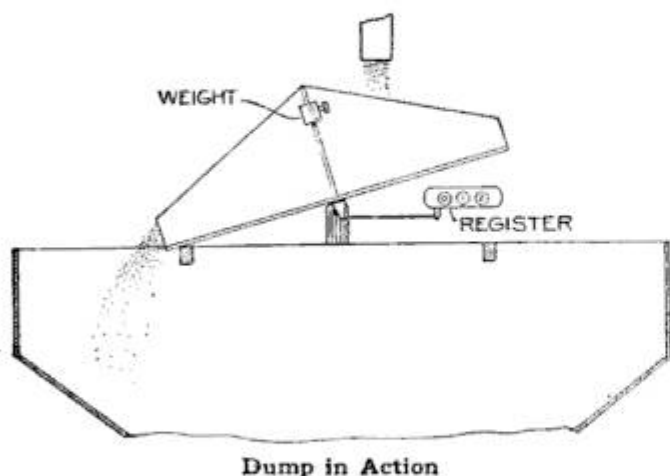
Drill in Holder

work. Fitted with the holder it ran every day for over three months.—Contributed by Donald A. Hampson, Middletown, N. Y.

☞ Noseglasses can be held firmly to the nose by the use of powdered rosin. This is flesh colored and the heat will make the glasses stick so no ordinary wind will dislodge them.

Automatic Wheat Dump

The device shown in the sketch is intended for the same purpose as the automatic scales, says the American



Miller. The dump has a weight on a small bar, which can be set so that the box will dump with 30 lb. in either end. This will make 60 lb. when both ends are dumped. As the register works on every other dump, it registers 60 lb. or one bushel of wheat.

Hardening Narrow Strips of Steel

The method used by a correspondent of the American Machinist for hardening some narrow strips of steel without warping is given as follows:

The pieces were $\frac{3}{4}$ in. wide, $\frac{3}{32}$ in. thick and 4 in. long. I used a pair of ordinary tongs and heated the pieces in an open fire to the proper temperature. I then quickly transferred them to a pair of cold cast-iron tongs,



FIG. 1

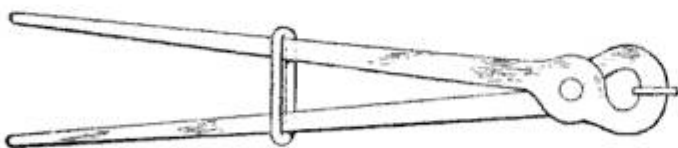


FIG. 2

Tong Jaws for Hardening Steel Strips

4 in. wide, as shown in Fig. 1, the jaws of the tongs being the same width as the pieces were long. After quenching

the pieces with these tongs, they were found to be straight and hard throughout.

If, as is often the case, it is desirable to have the center of the pieces soft and one or both edges hard, they should be held in tongs made heavier, as shown in Fig. 2. When heated directly in these clamping tongs, the heat in the tongs will prevent the center of the piece from cooling as rapidly as the edges, and hence it will remain soft.

Offset Handle for Chisels

Gouges and chisels with bent shanks are expensive, and where a great many of these tools are necessary, two sets, one of straight and one of bent shanks, makes a large parcel to carry. A detachable handle, as illustrated, will enable one to carry only half the tools



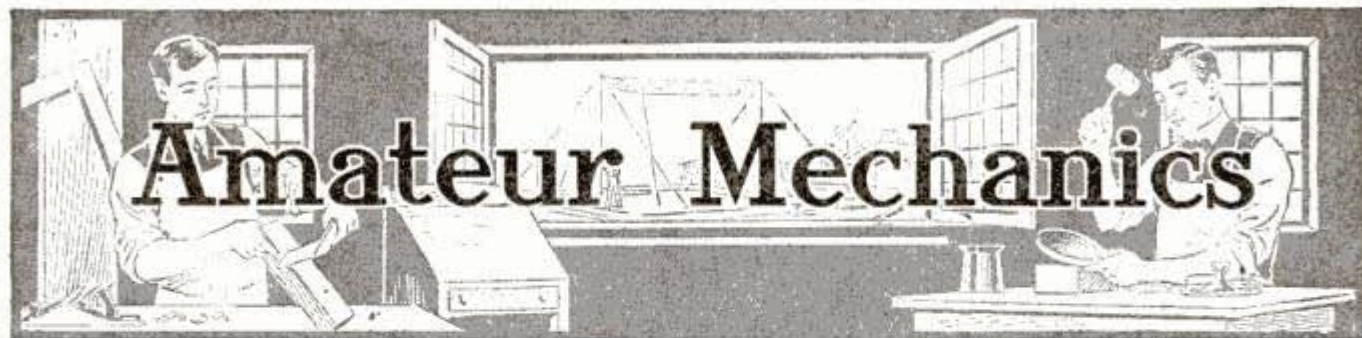
Handle on Chisel

that otherwise would be necessary. The handle can be changed from one tool to another.

The handle should be made of boxwood or some other very strong and tough wood. Cut a groove in the lower part for the shank of the tool. A part of the shoulder and a little of the shank must be ground off on some gouges and chisels so that the tool handle will be in the same plane as the cutting edge. Make the ferrule and ring strong but very thin. This will save grinding the shank off, thus keeping it in condition to replace the old handle when desired.

"Fishing" a Cork from a Bottle

Double a stout cord and thrust it through the neck and into a bottle containing a cork, then invert the bottle and pull the string out. The string will remove the cork.



How to Make an Electrotpe Stamp

The method described in the following produces a very good metal stamp for any name, initial, drawing, etc.

Procure a smooth and perfectly level sheet of brass about $\frac{1}{16}$ in. thick and about 3 by 4 in. in size. Nickelplate the brass so that the copper deposit will not stick to it. If a small plating outfit is not at hand the piece may be plated at a local plating works for a nominal price. Dip the plate in melted paraffin until the coating is about $\frac{1}{16}$ in. thick and see that no metal is exposed. Drill a hole in one corner and attach a wire.

Draw the letters or sketch desired, using a metal stylus having a sharp point, taking care to make the lines scratched in the wax clean and open to the surface of the metal (Fig. 1).

A large open-mouthed bottle or glass tank will be required for the plating solution, which is made by dissolving copper sulphate in water until the solution is saturated with the sulphate and then adding a few drops of sulphuric acid. Immerse the plate in the solution as shown in Fig. 2 and connect with the zinc pole of the battery. Put a piece of pure copper in on the opposite side of the jar and connect with the carbon pole of the battery, using care in each case to keep the connection of the wire and the upper part of the plate above the surface. One or two dry cells will be sufficient. If the current is right, the deposit on the waxed plate will be a flesh pink; if too strong, it will be a dirty brick color and the plate will have to be washed and the current reduced. When the desired thickness of metal

is deposited, remove the plate and pour boiling water on the back. This will remove the thin copper shell and the nickeled plate may be laid away for future use.

Procure a flat pan and after placing the shell in it, face down, sprinkle a



FIG. 1



FIG. 3

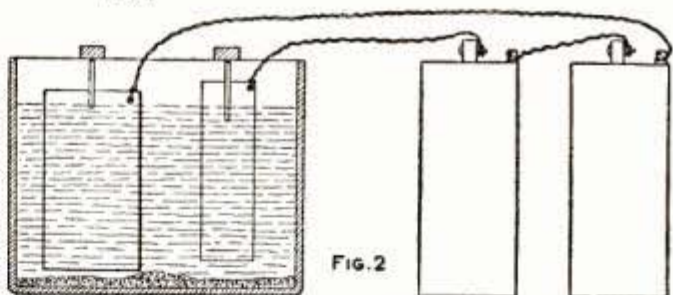


FIG. 2

Making the Copper Shell

little resin or soldering flux on the back. Lay three or four sheets of the lead from tea packages on the back of the shell and heat it over a spirit lamp or on the stove until the lead melts and runs into the crevices on the back of the copper thus making it solid and suitable for mounting. Mount as shown in Fig. 3 with small brass screws and after polishing the surface to remove dirt, etc., the stamp is ready for use.

An ordinary stamp pad will do for inking, but the best ink to use is printer's slightly thinned, as the ordinary rubber stamp ink is not suitable for a metal stamp.—Contributed by S. V. Cooke, Hamilton, Ont.

Home-Made Motion-Picture Camera and Projector

IN THREE PARTS—PART III

The Projector

The film positives are projected on a screen with the same kind of a lantern as is used for lantern slides, with the addition of the device for stepping the film through, one picture at a time,

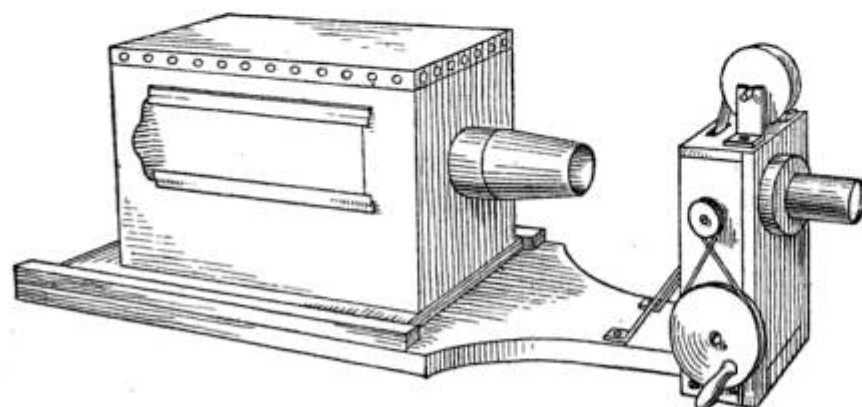


Fig. 8—Projector Complete

and flashing light on each picture as it remains stationary for an instant. The projector (Fig. 8) is composed of a lamp house, a condensing lens to make the beam of light converge upon the film for illuminating it evenly, a film-stepping device, and a projecting lens for throwing the enlarged picture of the illuminated film upon a screen.

The lamp house is made of ordinary stovepipe metal and the dimensions given in the sketch are for a size suitable to use an acetylene or gas burner. The metal is laid out as shown by the pattern (Fig. 9) and bent on the dotted lines to form the sides and ends of the house. The joint may be riveted, or, if taken to a tinshop, lock-seamed. The cover is cut out as shown, the sides and ends having bent holes which are covered on the inside with perforated sheet metal, A. In order to deflect the light, a small angular strip, B, is riveted

on so that its upper portion will cover the holes and allow a space for the heat to pass out. The cover may be hinged or set on like a cover on a can. The lamp house is attached to a sliding wood base for adjusting its position on the base-board.

The condensing lenses are fixed into a metal barrel having a tapering end. This can be made of the same material

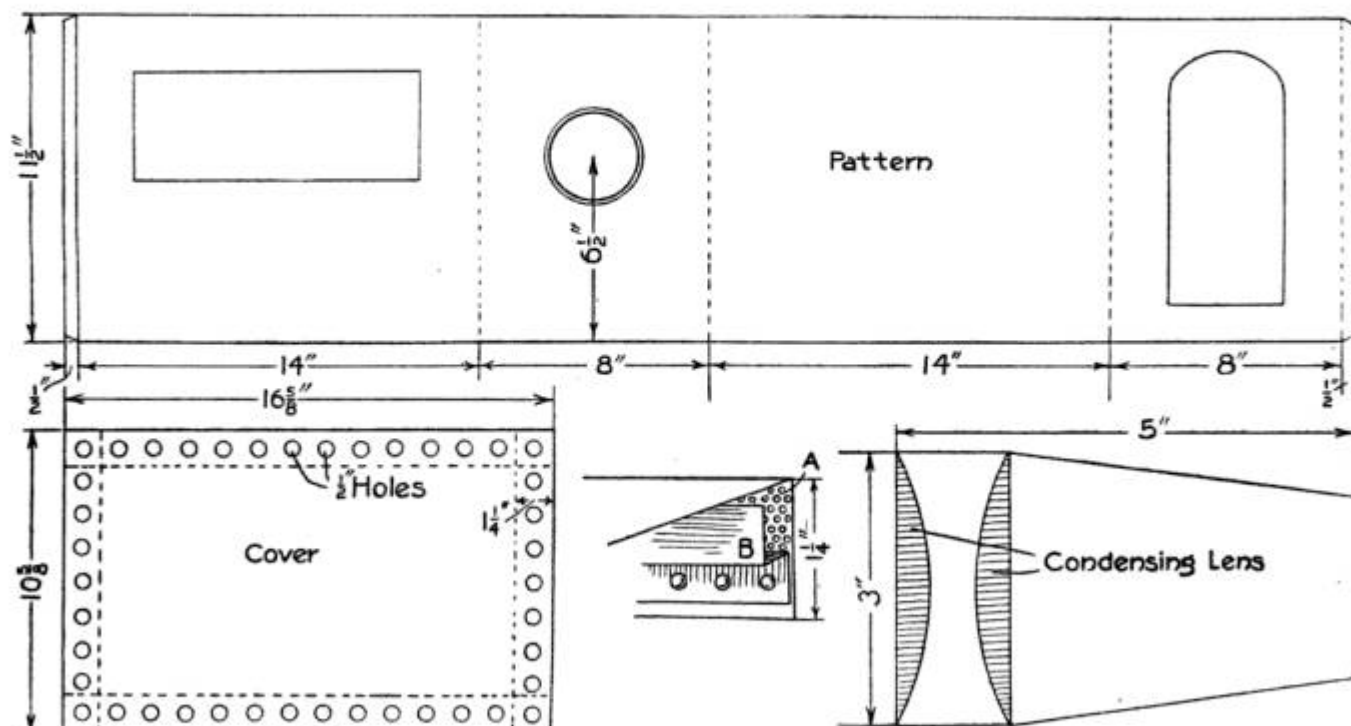


Fig. 9—Details of the Lamp House

as used in the lamp house. The parts can be rolled and a lock joint made at a local tinshop, or the pieces shaped over a wood form and riveted. Small L-shaped pieces are riveted to the in-

of the required size, or a lens of 12-in. focus enlarging a 1-in. film to about 6 ft. at a distance of 24 ft. A regular lens fitted in a metal tube can be purchased from a moving-picture stock

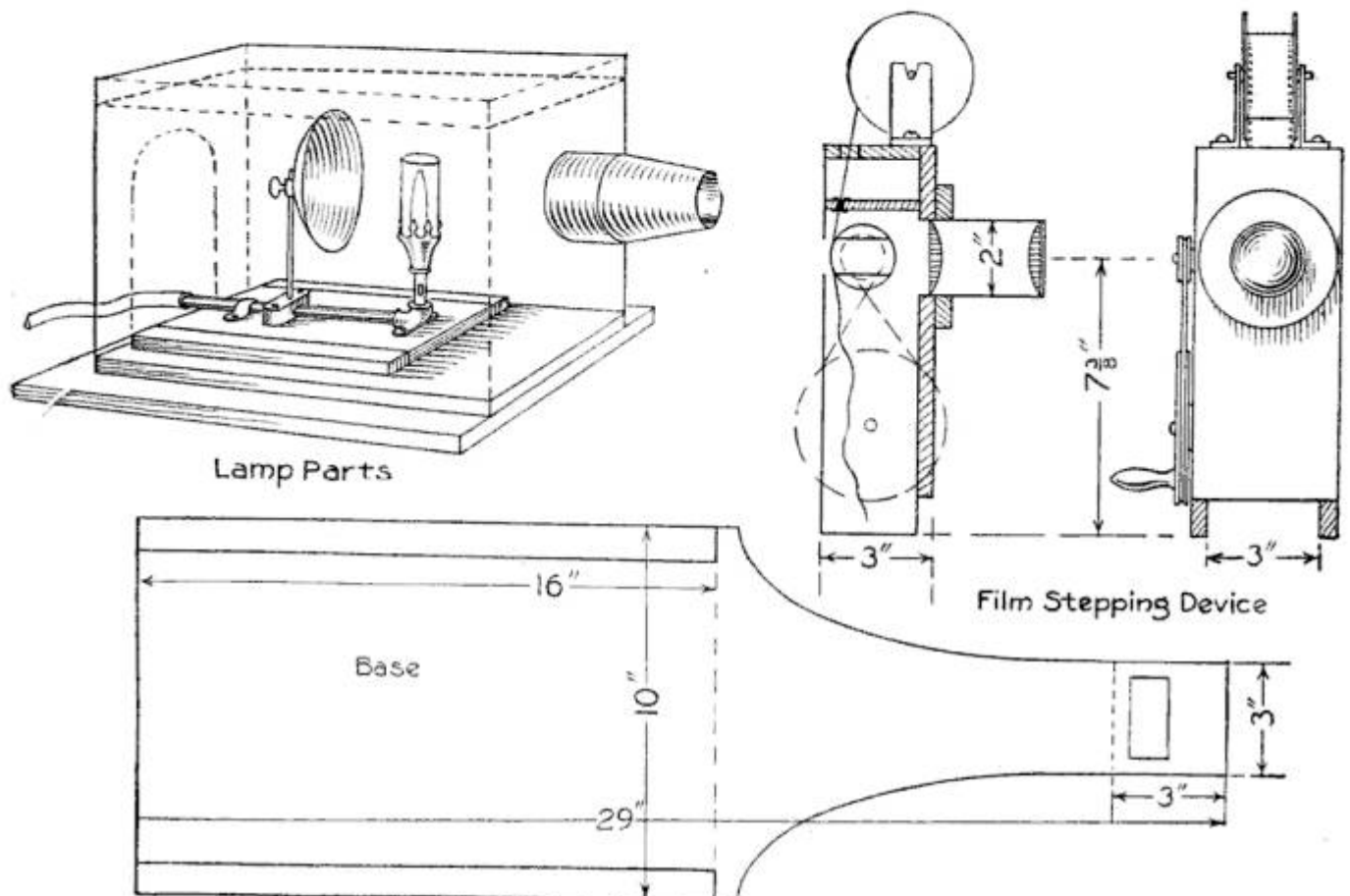


Fig. 10—Details of the Lamp, Stepping Device and Base

ner surfaces to hold each lens in place. A rim is turned up on the back end of the metal tube for attaching the lens barrel to the lamp house.

An ordinary mantle or acetylene burner is attached to a gas pipe that has for its base a drop elbow fastened to a sliding board similar to the slide of the lamp house on the baseboard. A good reflector should be attached to a standard just back of the burner. The standard is also fastened to the sliding board. The proper distance of the light from the condensing lens can be easily set by this adjusting device. This arrangement is shown in Fig. 10 in the diagram entitled "lamp parts."

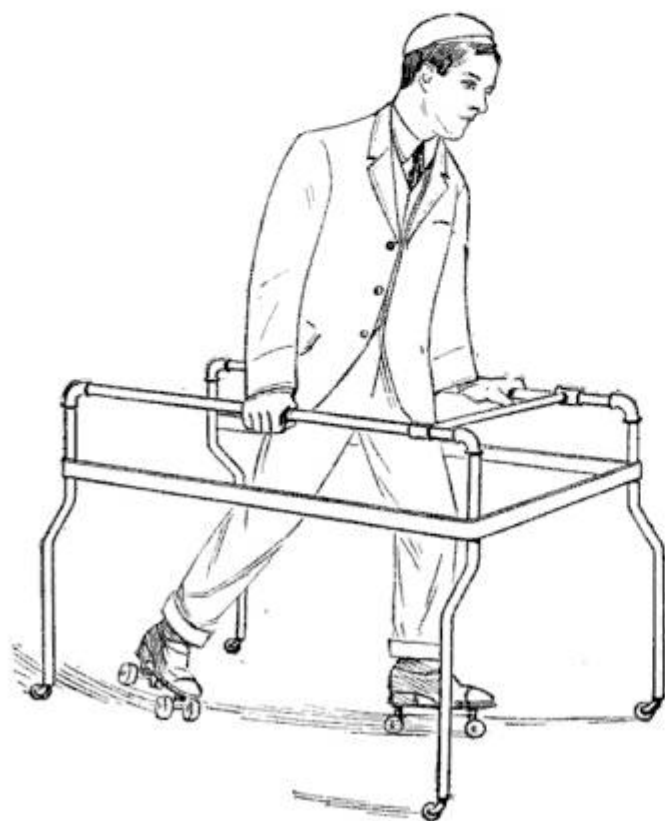
The device for stepping the film is a duplicate of the one used in the camera as described in Part I, with the exception of the lens. The lens should be about 2 in. in diameter with such a focal length that will give a picture

house at a reasonable price. The box is made up similar to the camera box, but with a metal back instead of the wood. The intense heat from the light would quickly burn the wood and for this reason the light should be kept from the film while it is not in motion. The projecting lens barrel should be fitted snugly, yet loose enough for focusing.

The baseboard is cut as shown and the film-stepping device is firmly attached to the small end. The sides extend over the baseboard and are fastened with screws and braced with metal brackets. The slot in the small end of the baseboard is for the film to pass through. The film should have a tension the same as in the camera with velvet placed on the edges of the partitions. It is well to have a guide below the roller shutter to keep the film from encircling the roller as it turns.

Beginner's Helper for Roller Skating

One of the most amusing as well as useful devices for a beginner on roller skates is shown in the sketch. The



Beginner Cannot Fall

device is made of $\frac{3}{4}$ -in. pipe and pipe fittings, with a strip of sheet metal 1 in. wide fastened about half way down on the legs. On the bottom of each leg is fastened an ordinary furniture caster which allows the machine to roll easily on the floor. The rear is left open to allow the beginner to enter, then by grasping the top rail he is able to move about on the floor at ease, without fear of falling.—Contributed by J. H. Harris, Berkeley, Cal.

Atmospheric Thermo-Engine

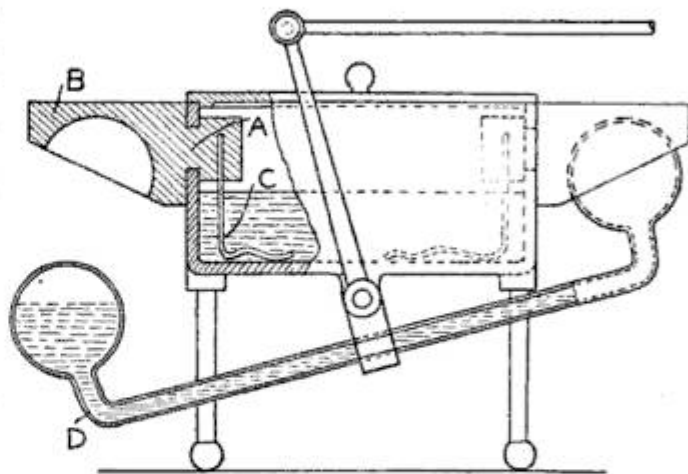
The device illustrated has for its object the production of power in small quantities with little attention and no expense. All that is needed to produce the power is common ordinary water, and the device will continue to operate until the amount of water placed in the receptacle has evaporated.

The device consists of a rectangular vessel provided with legs and a cover.

Each end of the vessel is provided with an opening, A, adapted to receive and hold in place plaster-of-paris cups, B. The part extending into the tank is provided with a wick, C, which reaches to the bottom of the vessel. A glass tube, D, is provided with a bulb on each end and partly filled with alcohol, the remaining space being exhausted of air. The glass tube is secured to a hanger which is pivoted to the bottom of the vessel.

After a quantity of water has been poured into the vessel and the device allowed to stand undisturbed for a few minutes, the tube will begin to move with an oscillating motion. Some of the water in the vessel has been conducted by means of the wicks C to the bent plaster cups, from the surface of which it evaporates, thus absorbing latent heat and producing a lower temperature in the cups than that of the surrounding atmosphere. The bulb in contact with the cup thus acquires a lower temperature than the one at the end D, which will result in condensation of the alcohol vapor within the former. The pressure of the vapor in the lower bulb will then force the alcohol up the inclined tube into the higher bulb, the evaporation in the lower bulb maintaining the pressure therein.

When a sufficient quantity of alco-



Details of the Engine

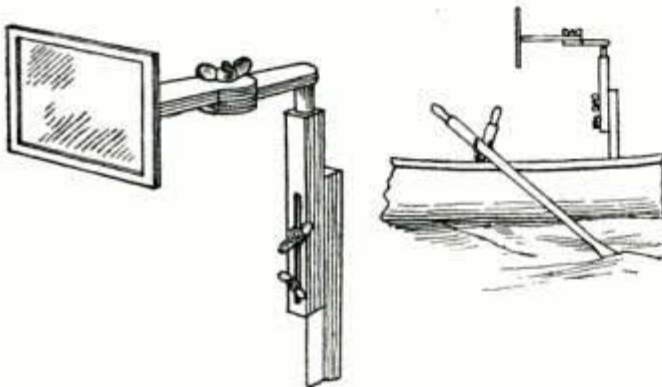
hol has been forced into the upper bulb, it will descend, and thus elevate the other bulb into its cup. The phenomena just described will be repeated in this bulb and the oscillation will

continue until the water in the vessel has been absorbed and evaporated.—Contributed by E. W. Davis, Chicago.

A Mirror an Aid in Rowing a Boat

The young oarsman is apt to experience difficulty in keeping a straight course until he has had some practice. Rowing a boat in a narrow channel calls for considerable skill to hold a course in mid-stream. A variation of force in pulling the oars almost instantly results in the rowboat making a landfall on one or the other of the banks.

The skilled oarsman does not need an appliance that the beginner might welcome. With the aid of a mirror



The Mirror Attached to a Boat

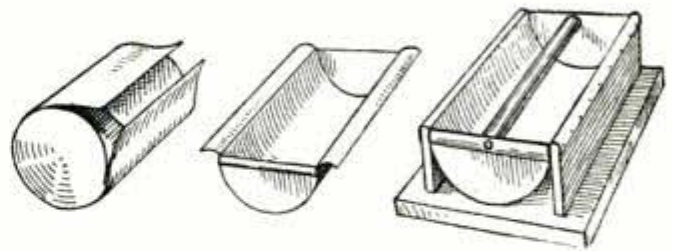
conveniently supported at a suitable angle and height before the oarsman's face, the water, the shores and approaching boats may be seen with distinctness. The mirror may be set directly in front or a little distance to one side as shown in the sketch.—Contributed by Thaleon Blake, Sidney, O.

Developing Tray Made of a Tin Can

Obtain a tomato or other can, 5 or 6 in. long and 4 in. in diameter, which should be secured before it has been opened, says Camera Craft. Cut both ends exactly half way around, keeping close to the edge, as shown in the first sketch, and slit it lengthwise to open the side. Trim off the end pieces to within 1 in. of the center and cut off the surplus tin of the sides of the can, leaving enough to bend over and form

the ends of the tank as shown in the second sketch.

The support, as shown in the last sketch, is made by screwing together



For Developing Roll Films

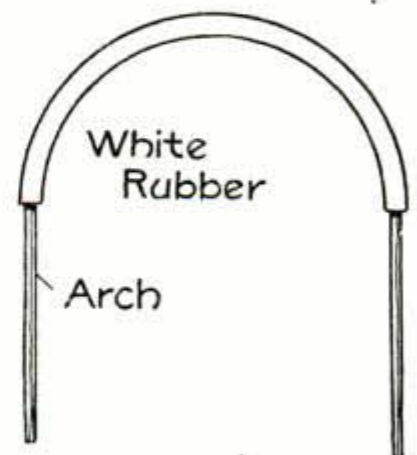
three pieces of wood, the base piece being $6\frac{1}{2}$ in. square and thick enough to make the tank solid and heavy. Bend the sides of the can over the edges of the two uprights and tack them firmly to the sides, bending the tin so as to have a rounded surface that will not scratch the films. The ends of the can are bent over sharply to form the sides of the tank. Procure a round wood stick, the length of the tank, place in position, and fasten with a screw through the tin at both ends. Give the whole tank two coats of black asphaltum varnish to protect it from the action of the developer.

White Rubber on Croquet Arches

A white cloth is usually tied to croquet arches when the game is played

late in the evening. A much better plan is to slip a piece of white rubber tubing about 1 ft. long on the arch. This tubing can be purchased at any local drug store.

This makes the top part of the arch conspicuous so that it may be plainly seen in the dark, and, when the tubing becomes soiled it can be cleaned off with a damp cloth.—Contributed by John Blake, Franklyn, Mass.



A Wrestling Mat

The cost of a wrestling mat is so great that few small clubs can afford to own one. As we did not see our way

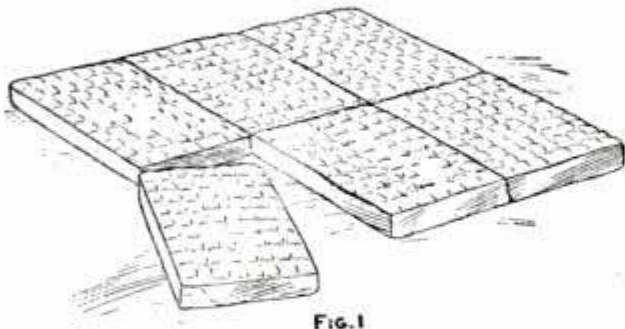


FIG. 1

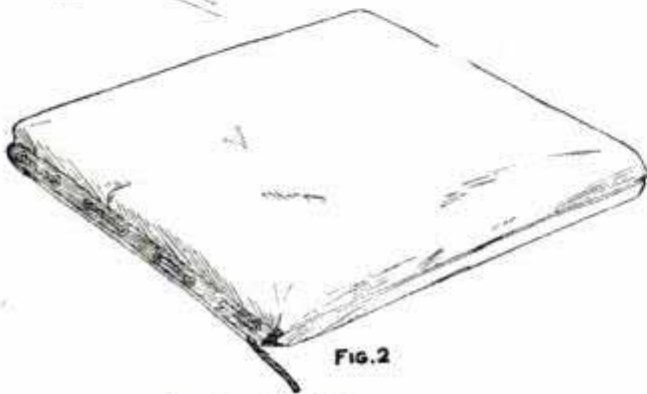


FIG. 2

Made of Bed Mattresses

clear to purchase such a mat, I made one of six used bed mattresses (Fig. 1) purchased from a second-hand dealer. I ordered a canvas bag, 12 ft. 3 in. by 12 ft. 9 in., from a tent company, to cover the mattresses. The bag consisted of two pieces with the seam along each edge. The mattresses were laid side by side and end to end and the bag placed on and laced up as shown in Fig. 2.—Contributed by Walter W. White, Denver, Colo.

A Pocket Voltammeter

Remove the works and stem from a discarded dollar watch, drill two $\frac{3}{16}$ -in. holes in the edge, $\frac{3}{4}$ in. apart, and insert two binding-posts, Fig. 1, insulating them from the case with cardboard. Fold two strips of light cardboard, $\frac{1}{2}$ in. wide, so as to form two oblong boxes, $\frac{1}{2}$ in. long and $\frac{3}{16}$ in. thick, open on the edges. On one of these forms wind evenly the wire taken from a bell magnet to the depth of $\frac{1}{8}$ in. and on the other wind some 20-gauge wire to the same depth. Fasten the wire with gummed label to keep it from unwinding.

Glue the coils to the back of the case and connect one wire from each binding-post as shown in Fig. 2, while the other two wires are connected to an induction coil lead which is inserted in the hole from which the stem was removed. Fasten a brass-headed tack to the case at the point F with sealing wax or solder and bend a wire in the shape shown in Fig. 3 to swing freely on the tack. Attach a piece of steel rod, $\frac{3}{4}$ in. long, in the center coil, C, Fig. 2.

A rubber band, D, connects the steel rod C with the top of the watch case. The ends of the rubber are fastened with sealing wax. The rubber keeps the pointer at zero or in the middle of the scale. Do not use too strong a rubber. A dial may be made by cutting a piece of stiff white paper so it will fit under the crystal of the watch. An arc is cut in the paper, as shown in Fig. 1, through which the indicator works.

To calibrate the instrument, first mark the binding-post A, which is connected to the coil of heavy wire, for amperes and the other post, V, to the coil of small wire for volts. Connect the lead and the post marked A to one, two and three cells and each time mark the place of the pointer on the dial. Take corresponding readings on a standard ammeter and mark the figures on the dial. The volt side of the dial may be calibrated in the same manner, using a voltmeter instead of the ammeter. The place where the



FIG. 1

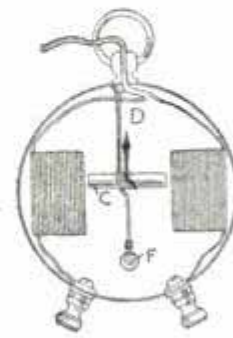


FIG. 2



FIG. 3

Voltammeter in a Watch Case

indicator comes to rest after disconnecting the current is marked zero.—Contributed by Edward M. Teasdale, Warren, Pa.

Wood-Working for Beginners

Dovetail Joints, Fitting and Hanging the Door, Placing the Lock, Setting the Glass

By IRA S. GRIFFITH

CHAPTER XVII

Directions for Making Dovetail Joints

There are no new principles in the layout or working of the corner joints of the ordinary type of drawer. The making of the dovetail joints for the cabinet drawers, however, will require specific directions for their making. The tails, Fig. 118, are to be made on the drawer sides and the pins or tenons on the drawer back. Locate the shoulder lines on the back and front at the same time, and on the sides, and square knife lines around in the usual manner. On the ends of the back and front lay off center lines for the ten-

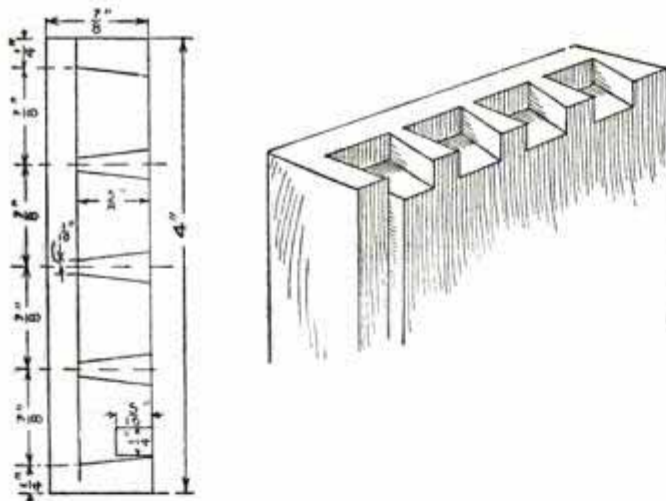


Fig. 119—Front Board Mortise

ons, Fig. 119. Set the bevel square to a slope of $\frac{5}{8}$ in. in 3 in. and lay off the flares across the ends. The greatest flare must be at the face side. Carry these lines down the two broad surfaces of the drawer, back as far as the shoulder lines. On the drawer front carry them on the face side only.

Set a gauge to a distance equal to that wanted for the length of the tails on the forward ends of the drawer sides or ends, and gauge across both ends of the drawer front, the head of the gauge being held against the face side. With fine cutting tenon or back saw, saw the tenons, keeping the kerf on the waste, of course. With a chisel,

and working from both sides, cut the shoulders. Figure 120 shows the man-

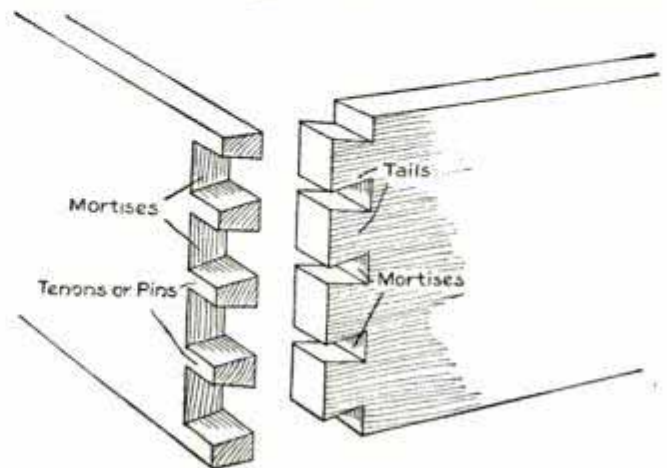


Fig. 118—Dovetail Joint

ner of sawing and chiseling the blind dovetails.

To make the tails place the tenons upon the drawer sides so that the face side is on the knife line indicating the shoulders and mark the sides as in Fig. 121. With try-square and bevel square complete the layout on the ends and far side. Saw the sides, then chisel the shoulders, chiseling from both sides.

If the parts have been carefully made, it ought to be possible to fit

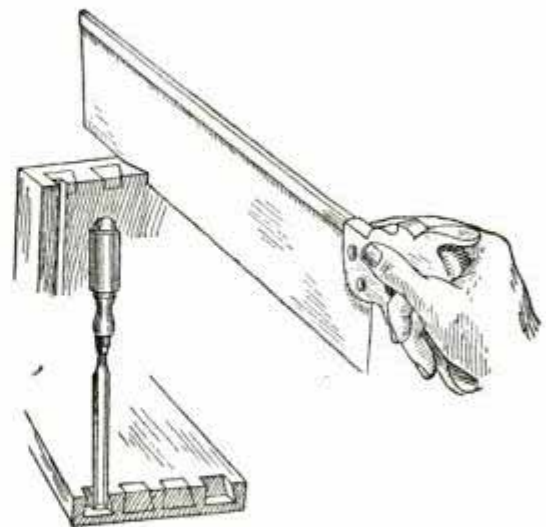


Fig. 120—Sawing the Mortises

them together with but little trimming. Fit them together dry, bottom and all, to see that all is ready, then

glue and clamp. As in the panel, put no glue on the bottom unless a little at the center of the ends. In fitting

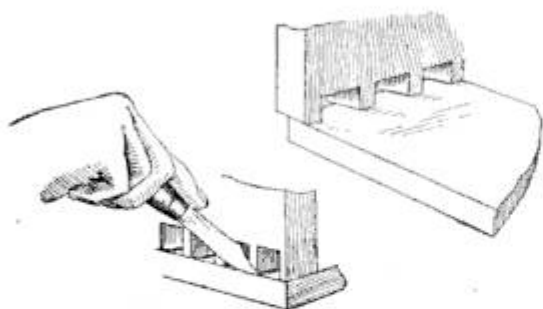


Fig. 121—Marking the Tails

the bottom, should it prove thicker than the groove, plane the under side of the drawer bottom at the ends. After the glue has set, the joints may be smoothed up and the drawer fitted to its runway. The pull should be placed, but should be taken off during the application of the finish.

The door of the cabinet is to be fitted and hung while the glue is setting on the drawer joints. Plane one edge and the top of the door until they fit

nect these marks with a straightedge. Plane to the line, testing occasionally by holding the door against the frame to make sure any irregularities are provided for. That the door may open easily, it should have a little play and the back arrises should be lowered slightly in planing the edges. Secure the length on each side of the door and plane up the remaining end accordingly. No stop will be necessary except at the top of the door, against which the door can bump, the shelf supports acting as stops.

In hinging the door, place the lower hinge just above the lower rail and the

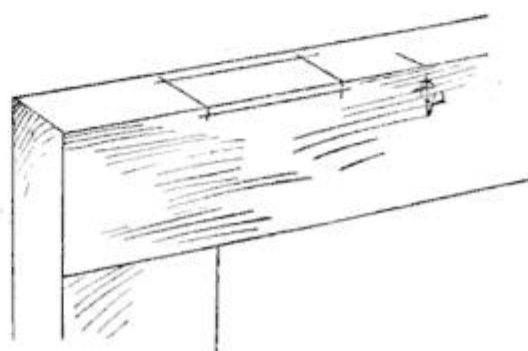


Fig. 122C—Gauged to Faceplate

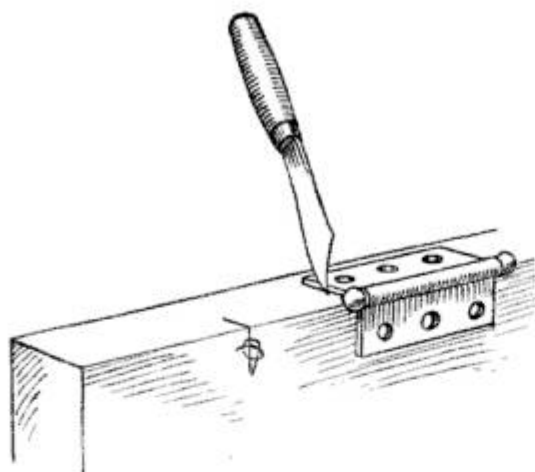


Fig. 122A—Marking Gains

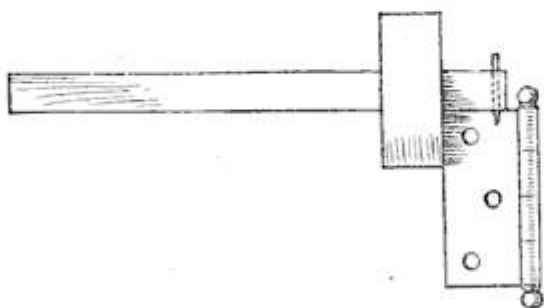


Fig. 122B—Finding Depth of Gain

the frame of the cabinet. Secure the width of the opening, top and bottom, and transfer it to the door and con-

upper hinge just below the upper rail. Place the door against the stops and slip something under it—a chisel or knife will do—to hold it in place, then mark on both door and jamb simultaneously the knife marks for the location of the upper edge of the top hinge and the lower edge of the lower hinge. Take down the door and, holding the hinge as in Fig. 122-A, mark the length of the gains. Do this on both door and jamb, making sure to have the two correspond. Set a gauge for the width of the chiseled gain into which the hinge leaf is to enter, Fig. 122-B. This distance is to be determined by the thickness of the door and the amount the knuckle is to project. In this case let the line be gauged within $\frac{1}{8}$ in. of the arris, gauging from the face side, of course, Fig. 122-C. Next set a gauge for the depth the hinge is to be sunk, Fig. 122-D. With these settings gauge both door and jamb. In gauging the jambs for the width of gain, it frequently happens that the stops interfere. This

can be remedied by having one gauge with its end sawed off very close to the spur. In this cabinet the stops might have been left off until after placing the hinges.

If loose pin butt hinges are to be used, separate the parts and attach one to the door and its remaining leaf to the jamb. If the hinge is what is known as a plain butt, they will have to be attached to either door or jamb and the door held up while the remain-

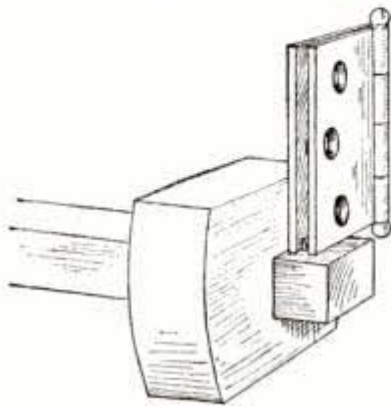


Fig. 122D—Setting Gauge for Depth

ing leaves are fastened to the corresponding gains. Put only one or two screws in each leaf until the door has been put in place and tested.

Even with expert mechanics it is necessary to make a trial test. If the hinges bind, that is, if the door cannot be shut without springing the hinges, remove the door and the leaf of the hinge that causes trouble on either jamb or door and insert a piece of cardboard or heavy paper the full length of the hinge and again test. If the hinge in the first test fails to draw the door up against

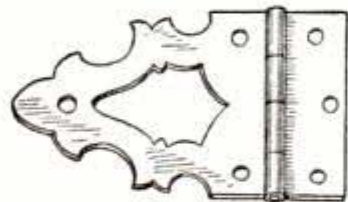


Fig. 123

the jamb, it will be necessary to remove the hinge and chisel the gain deeper. Allow a little play for the wood finish as this will add some thickness and a little additional allowance must be made for swelling, the amount depending upon the size of the door—in this case not more than $\frac{1}{16}$ in. on lock side and top and bottom. Fit the hinge side up practically tight, without forcing. The gains are to be scored and chiseled according to processes previously learned. A comparatively new style of hinge is shown in

Fig. 123. It is easily applied. One leaf is gained into the jamb, the door

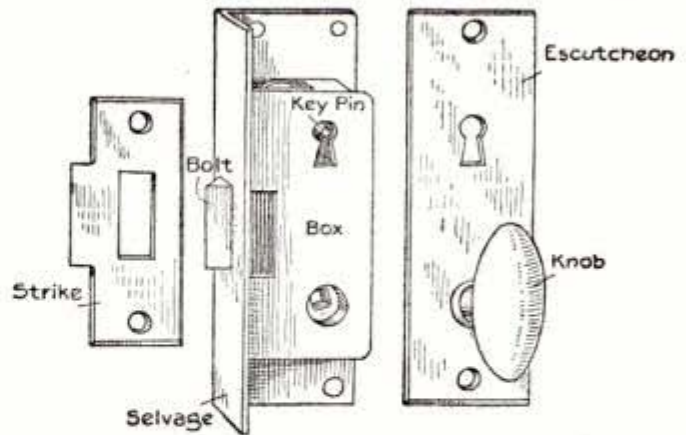


Fig. 124—A Cabinet Lock

is then placed and the other or surface leaf is screwed to the door while the door is in this position.

Directions for Placing Lock

After hinging comes the locking. Figure 124 shows a common form of cabinet lock. The lock is attached by first locating a hole for the key and knob at a point somewhat above the center. Hold the lock against the stile and mark through the box and press the key pin against the stile.

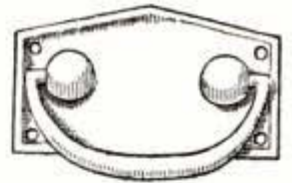


Fig. 125

The lock is to be let into the stile so that the holes will need to be bored back from the edge of the stile far enough to allow the selvage to rest slightly below the surface of the edge of the stile about $\frac{1}{32}$ in. This is to allow for planing the door, should future unlooked-for swelling necessitate. Again place the lock against the stile and mark off the length of the gain for the selvage. Gauge for the depth and width of the selvage and chisel, after scoring, in the usual manner. Next chisel just enough to let in the box of the lock and the face. Place the screws. Swing the door in place and turn out the bolt and mark its vertical position on the edge of the jamb. Square these lines back on the jamb and after securing the horizontal measurement from the door, transfer it to the jamb and mark the near side of the small mortise which is to hold the bolt when the

door is locked. Place the strike and knife around it and then chisel the mortise carefully. Screw the strike fast

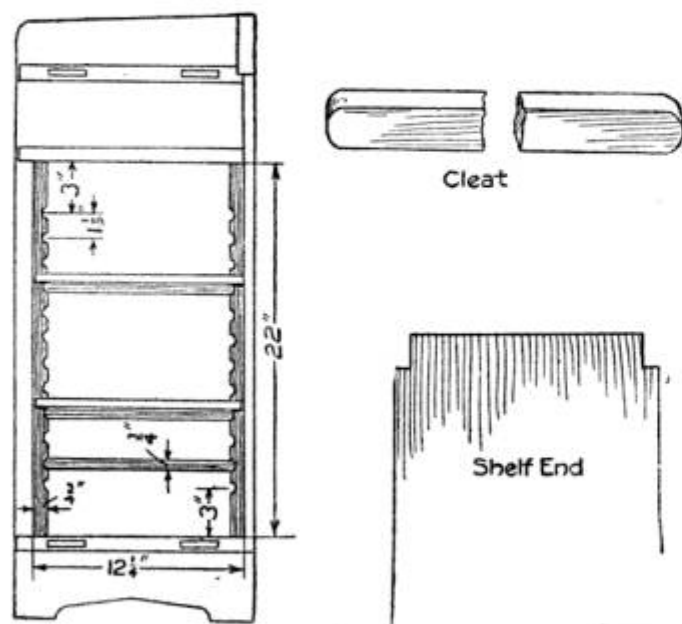


Fig. 126—Shelving Details

and chisel out enough to let the bolt enter it.

Figure 125 shows a drawer pull. The manner of setting it is easily seen.

Directions for Shelving

The shelving is to be made next. While the drawing shows but two shelves, there may be any number desired. There are various ways of holding movable shelving in use among cabinet workers. The simplest is a

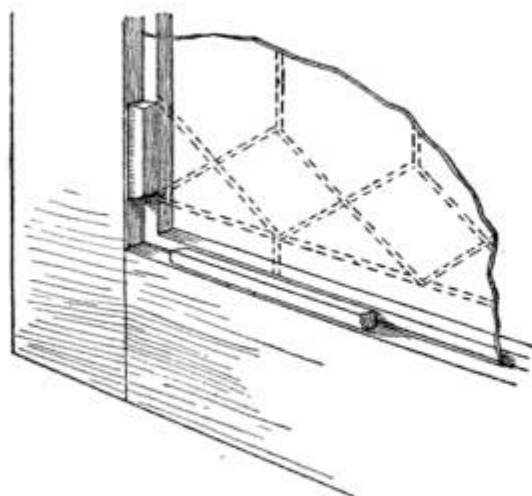


Fig. 127—Setting the Glass

metal fixture so made that it slips into one of a series of holes bored in the sides of the cabinet at each of the four corners. These holes are uniformly spaced and allow the shelves to be

placed in many different spacings. Small dowels would answer the same purpose. Figure 126 illustrates another and more substantial method. For this, square up two pieces of $\frac{1}{4}$ or $\frac{3}{8}$ -in. stock to a width of $1\frac{1}{2}$ in. Gauge a line down the middle and lay off on this holes $1\frac{1}{2}$ in. apart, beginning about 2 or 3 in. from the bottom. Bore $\frac{3}{4}$ -in. holes at these centers and rip along the gauge line. Plane off the saw marks, saw the pieces to length and nail them one in each corner of the cabinet. Make twice as many cleats as there are to be shelves, rounding the ends after having determined the length by measuring the cabinet. The width of these cleats will need to be $\frac{3}{4}$ in. and the thickness the same as the corner supports. These cleats can be placed in any desired location. Square up the shelves and with try-square, gauge and saw lay out and notch the ends so that their ends will rest upon the cleats.

Directions for Setting Glass

There remains the making of the fillet which is to hold the ornamental glass in the frame of the door. This may be made square. Make it in one piece, then miter and fit it after the glass is set. Before setting the glass the cabinet should be scraped, sandpapered and made ready for the finish. The stain and filler should be applied, then the glass set. In setting this glass, place a cushion of putty in the rabbet first, then place the glass in the rabbet, pressing it firmly into the putty. Put another layer of putty on the glass and place the fillet of wood on this. Fasten the fillet in place, Fig. 127, with small brads and putty the holes made with putty colored to match the filler.

(The End)

☞ Fish will be scared by objects floating on the surface more easily than by those in the water, which is well to remember in fly fishing.

☞ Never use oil with any grit in it, throw it away.

Repairing Box Cameras

In repairing the inner part of box cameras which have been broken loose, use a binding of strong black cloth well glued in place. This will materially strengthen the joints where the wooden pieces are so thin that it is impossible to use brads in holding them together.

Do not forget to thoroughly clean all the old glue or cement from the joints with a rasp or sandpaper before attempting a repair.

A Fishhook Box

A box that may be used to hold fish-hooks, sinkers, matches or any small articles, can be made from two empty shot-gun cartridges as shown in the sketch. The paper is cut from the brass part of one shell at the place marked A, Fig. 1, and the brass part, Fig. 2, is used for a cap on the other

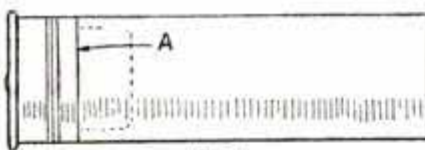


FIG. 1



FIG. 2



FIG. 3

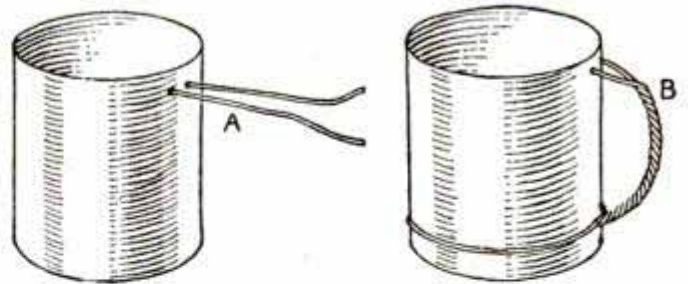
Made of Shotgun Shells

shell (Fig. 3). Coating the box with shellac will improve its appearance.—Contributed by Abner B. Shaw, N. Dartmouth, Mass.

A Tin Drinking Cup for the Camp

If in need of a drinking cup while camping, a temporary cup can be made of a tomato or baking-powder can. Punch two holes near the top of the can; bend a piece of wire and place the ends through the holes as shown at A in the sketch. Pull the ends to draw the loop close up on the inside of the tin and then twist the ends to form a handle as shown at B. When there

is enough wire twisted to form a good handle, pass the ends around the can



Handle on a Tin Can

at the bottom and twist them together on the opposite side.—Contributed by W. A. Lane, El Paso, Tex.

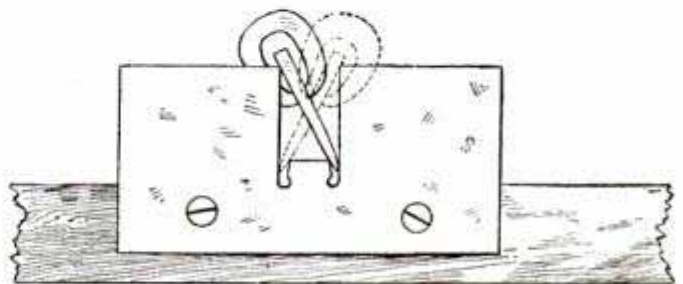
A Bookmark

A very handy bookmark can be made by attaching a narrow ribbon to an ordinary paper clip and using it as shown in the sketch. The clip is slipped over the binding in the back of the book as shown in the sketch.—Contributed by Chester E. Warner, Kalamazoo, Mich.



Kitchen Knife Sharpener

A good serviceable knife sharpener may be made from a piece of steel cut as shown with two screw holes drilled for fastening it to a piece of wood or to a table. The knife is drawn through and sharpened on either side. Both positions of the knife are shown. The



Sharpener on Table Edge

steel is hardened before fastening it in place.—Contributed by George Madsen, Chicago, Ill.

INTERESTING PATENTS

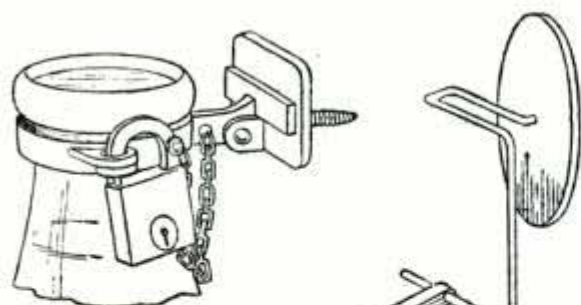


FIG. 1

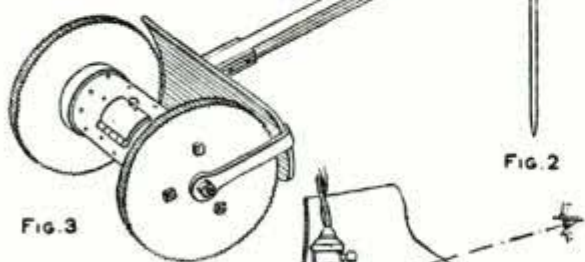


FIG. 2

FIG. 3

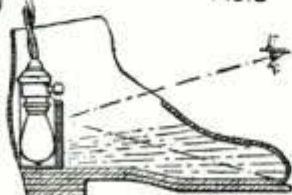


FIG. 4

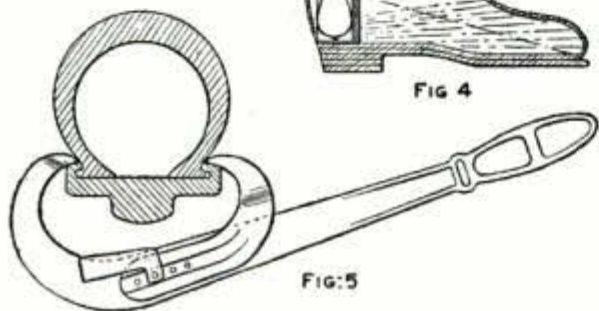


FIG. 5

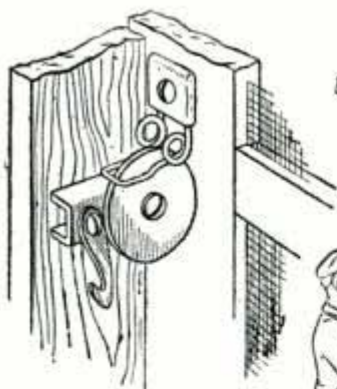


FIG. 7

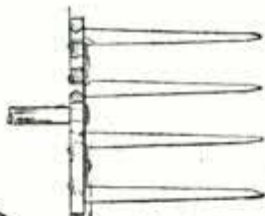


FIG. 6

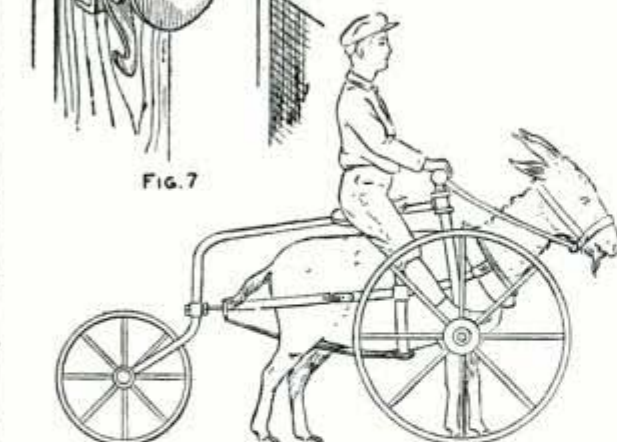


FIG. 8

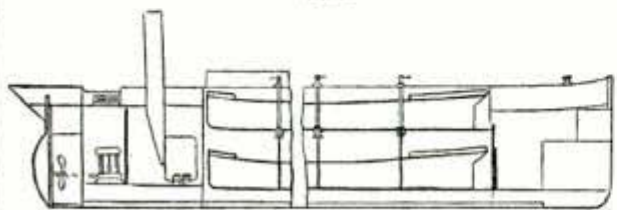


FIG. 9

MILK-BOTTLE LOCK—A milk-bottle locking device which can be quickly attached to a door entrance or window frame is shown in Fig. 1. The collar, which is locked around the neck of the bottle, will fit any milk or cream bottle now in use. The padlock is of the spring type, so no key is required by the milkman.

NECKTIE PIN—Probably the greatest objection to necktie pins is that innumerable holes are made in the fabric of a tie by their constant use. The pin shown in Fig. 2, is designed for wear anywhere in the tie below the knot, and has a horizontal U-shaped portion back of the head into which the strands of the tie are slipped. The pin is inserted in the back of the tie instead of in the front.

ASH DISTRIBUTOR—A device for distributing ashes and sand, comprising a pair of wheels with a perforated drum arranged between them is shown in Fig. 3. The ashes are placed in the drum or cylinder through a hinged door, and seep through the perforations as the device is wheeled over the walk or other surface being treated. An apron arranged back of the cylinder and wheels protects the operator from dust.

SHOEMAKER'S ELECTRIC LIGHT—Figure 4 is an electric light and mirror arrangement by means of which the shoemaker can illuminate the interior of the shoe he is working upon. It comprises a casing containing an electric light bulb, adapted to be inserted in the heel of a boot or shoe, and a mirror carried by the casing in front of the light. The parts are so arranged that the light rays pass below the mirror into the toe, and the shoemaker can examine this portion of the shoe by looking into the mirror.

TIRE-REMOVING TOOL—It is claimed that this tire-removing tool (Fig. 5) will release an automobile tire from its rim without damaging the rubber. The method of operation is clearly shown.

DETACHABLE-TOOTH FORK—A pitchfork provided with detachable teeth is shown in Fig. 6. The head of each tooth has a V-notch to fit a V-shaped projection in the openings of the crosspiece. These openings are a trifle large, so as to admit the heads of the teeth and allow them to slip over the V-shaped projections. When the teeth are so set, the pushing home of a latch holds them firmly in place.

DOOR CATCH AND LOCK—The purpose of this screen-door attachment (Fig. 7) is to prevent the door slamming, to provide a means of holding the door tightly closed, and to lock it when desired. A slight push from the inside or pull from the outside will open the door. All that is required to lock it is to slip the catch over the spring.

A WHEELED SADDLE FOR RIDING GOAT-BACK—Goats, unlike horses and little ponies, are not heavily enough built to allow of riding upon their backs, but goat-back riding is made possible by means of the wheeled saddle shown in Fig. 8. The arrangement has two wheels in front and one rear wheel. The goat is hitched under the frame bearing the saddle, so that the entire weight of the rider is carried on the wheels instead of on the goat. The front wheels are attached to a bow-shaped fork, within which the goat runs. A handlebar is provided for turning the front wheels in steering.

A SHIP FOR CARRYING SHIPS—The practice of carrying small river and harbor craft overseas in the hulls of big steamers has resulted in a new type of transport ship, patents for which have been granted to a Dutch inventor. His invention, as shown in Fig. 9, consists of a vessel having a section of its bow hull plates in the form of gates, which swing open to admit the craft to be transported. Water-ballast tanks are utilized to sink the hull sufficiently to allow the small vessels to be floated into the interior. The ship is designed to

PRACTICAL OR UNIQUE

carry two river boats or submarines of considerable size, the first boat floated into the hull being raised by tackle to allow the second to be floated in under it.

GAS SOLDERING TORCH—A simply constructed gas torch designed as a holder and heater of soldering irons is shown in Fig. 10. It is designed to heat irons from $\frac{1}{2}$ to 5 lb. in weight, and it is said that it will readily heat a 5-lb. iron in a little less than 3 min. After the iron is heated, the gas is turned off about one third, thereby saving fuel while keeping the iron at an even temperature. Any ordinary soldering iron can be used by bending the rod in the manner shown so that the blue flame will strike the copper bit.

LOCKING ATTACHMENT FOR ELECTRIC LAMPS—If you have ever groped your way into a dark factory building, warehouse, or other like structure, and, on turning the electric light switch, found that the lamp illuminating the part of the building you were standing in had been removed from the socket for use somewhere else, you will appreciate the device shown in Fig. 11. It is a locking device for electric lamps, which, when placed around the bulb and locked about the socket, prevents the removal of the bulb except by the person carrying the key.

COMBINED RAKE AND HOE WEEDER—Figure 12 is a garden weeder combining a rake with a triangularly shaped hoe. The parts of the head of the rake can be separated for the insertion of new teeth when the old are bent or broken, the teeth consisting of twenty-penny steel nails. The triangular hoe is used for cutting channels in which to sow seed or set small plants.

DEVICE FOR REGULATING THE FLOW FROM NURSING BOTTLES—A nursing-bottle stopper which can be manipulated to regulate the flow of milk is shown in Fig. 13. In the passage of the stopper is a valve so arranged that the rotation of the nipple on the bottle will raise or lower the valve in the passage, thereby decreasing or increasing the flow.

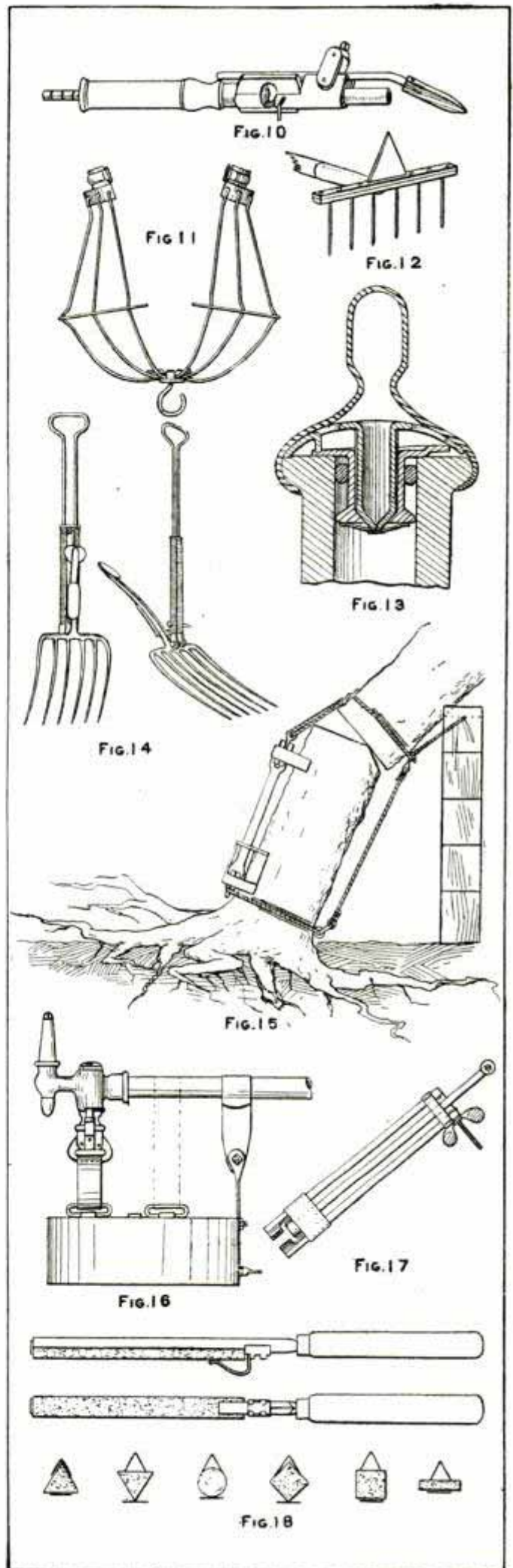
VEGETABLE DIGGING FORK—Figure 14 is a potato digger in the form of a fork, the handle of which is hinged and provided with foot-operating mechanism. Pressure on the pedal and a direct upward pull on the handle lifts the potatoes out of the ground without the operator having to bend his back. The compression spring on the handle throws the fork back into position for the next insertion into the soil.

A NEW IDEA IN STUMP PULLING—The means by which an inventor intends to compel a falling tree to pull its own stump by the force of its fall is shown in Fig. 15. A fulcrum block is placed alongside the trunk on the side the tree is to fall, means being provided to support the block at the desired elevation, and special tackle is made fast as illustrated. The trunk, in falling, tilts over the fulcrum block and drags the stump out of the ground.

TIME ACTUATING DEVICE FOR GAS COCKS—The alarm clock has been utilized in many ingenious ways for shutting off or turning on electric lights at a predetermined time. This clock device (Fig. 16) accomplishes the same purpose with gas cocks.

VETERINARY MOLAR EXTRACTOR—Animals, like human beings, have now and then to undergo the pain of tooth extraction. A veterinary molar extractor is shown in Fig. 17. It comprises oscillating gripping jaws, means for actuating the same to grip the molar to be extracted, an eccentric adapted to bear against the tooth forward of the gripping jaws, and means for turning the eccentric upon its axis whereby the gripped tooth is loosened and lifted from its socket by a strenuous pull.

OILSTONE HOLDER—The tool illustrated in Fig. 18 is designed to hold oilstones of triangular, square, round and rectangular cross section, and of any length up to 4 in., in $\frac{1}{4}$ in. to $\frac{3}{8}$ in. sizes. The holder makes it possible to use oilstones in the same manner that small steel files are utilized. One of its most extensive uses is in die shaping.



TWO commercial travelers, while on a train on the Oregon Electric Railway, got into an argument over the action of the automatic brake.

"It's the inflation of the tube that stops the train," declared the first traveler.

"Wrong, wrong!" shouted the second, "It's the output of the exhaustion."

So they wrangled for an hour. Then, when the train arrived at the station they agreed to submit the matter for settlement to the motorman. That gentleman, leaning condescendingly from the door of his car, listened with an attentive frown to the two travelers' statement of their argument. Then he smiled, shook his head and said:

"Well, gents, ye're both wrong about the working of the vacuum brake. Yet it's very simple and easy to understand. When we want to stop the train we just turn this 'ere tap, and then we fill the pipe with vacuum."—Electric Traction Weekly.

Mrs. Kominnes—How beautifully your ice cream is frozen!

Mrs. Whoaster—Yes; I froze it in my new fireless cooker.

An American who spends much of his time in England tells of a cockney who went to a dealer in dogs and thus described what he wanted:

"Hi wants a kind of dog about so 'igh an' so long. Hit's a kind of gr'y'ound, an' yet it ain't a gr'y'ound, because 'is tyle is shorter nor any o' these 'ere gr'y'ounds, an' 'is nose is shorter, an' 'e ain't so slim round the body. But still 'e's a kind o' gr'y'ound. Do you keep such dogs?"

"We do not," said the dog man. "We drowns em."—Harper's Weekly.

Smitherson went home one evening after a bad day at the gambling table. "Wife," he said, "have you anything to eat?"

"Yes, lots of things."

"Well, cook up everything in the house—everything."

"Gracious! Are you so very hungry?"

"No," answered Smitherson with finality. "I'm going to sell the stove."—Success.

A policeman saw a man acting rather suspiciously near a jewelry store one evening; so, going over to

him, he demanded to know who the man was and what he wanted.

"I'm thinking of opening a jewelry store in this neighborhood," replied the man, "and I'm watching to see if there is much trade." Whereupon the policeman went on his way, satisfied.

Next morning word was received at the station house that the store had been entered and robbed during the night. The policeman who had accosted the mysterious stranger said reflectively: "He may be a thafe, but he's no liar."—Lippincott's.

"Don't all those magazines make you tired?" asked the kind old gentleman of the heavily laden urchin.

"Nope," replied the kid, "I can't read."—The Upholsterer.

The story is told of the times of Aretas Blood and the old Manchester locomotive works that a student came to Mr. Blood once and wanted to study the business of locomotive building in his vacation days. The student came well recommended, and Mr. Blood, who never had much use for these "tech" people, sent him down to the boiler shop and placed him in charge of the foreman. The old man took the "tech" man around, and in the course of the inspection of the shop they came across one boiler on the inside of which was a man at work.

"How does that man get out?" inquired the "tech" man.

"Oh," said the venerable pilot, "he doesn't get out. We always count upon losing at least one man in building a boiler."—Manchester Union.

"You must take exercise," said the physician. "The motor car in a case like yours, gives the best exercise that—"

"But doctor, I can't afford to keep a motor car," the patient growled.

"Don't buy; just dodge them," said the other.—Stray Stories.

"What happened to Babylon?" asked the Sunday school teacher.

"It fell!" cried the pupil.

"And what became of Nineveh?"

"It was destroyed."

"And what of Tyre?"

"Punctured!"—Cleveland Leader.

NEW BOOKS

MONOPLANES AND BIPLANES—By G. C. Loening, B. Sc., A. M. This latest book on the design, construction and operation of aeroplanes includes a good historical account of the development of the heavier-than-air flying machine, an exposition of the scientific principles of the art of flying, and a description and comparison of notable types. The treatment indicates a profound research of available material from the earliest times to the present day. 340 pages, 6 x 8½, cloth, 278 illustrations, \$2.50 net. Munn & Co., Inc., New York.

THE SEVEN FOLLIES OF SCIENCE—By John Pin. A true "scientific novel," more fascinating than fiction, which should do much to correct a lot of erroneous notions in the popular mind and discourage enthusiastic but misinformed cranks in their efforts to achieve the impossible. 231 pages, 5¼ x 7¾, cloth, illustrated, \$1.25 net. D. Van Nostrand Co., New York.

POWER (Columbia University Lectures)—By Prof. Charles E. Lucke, Ph. D. A popularly written treatise explaining with technical accuracy how the available sources of natural energy are turned to account, and indicating the probable lines of future progress. 316 pages, 5½ x 7¾, cloth, illustrated, \$1.50 net. The Columbia University Press, New York.

THE PRINCIPLES OF SCIENTIFIC MANAGEMENT—By Frederick Winslow Taylor, M. E., Sc. D. The most revolutionary work on this subject that has yet appeared. A better title might be "The Conservation of Muscle and Brain," for Dr. Taylor shows in convincing fashion that in unnumbered cases the output of individual workers and of organizations may be increased many times if existing methods were improved along the lines he advocates. Better management is said to increase the wages of the worker as well as the profits of the employer. 144 pages, 5¾ x 9, cloth, \$1.50 net. Harper & Brothers, New York.

THE PRACTICAL COUNTRY GENTLEMAN—By Edward K. Parkinson. Tells how the gentleman farmer can turn his farming hobby to good account and make money instead of losing it. 180 pages, 5 x 7½, cloth, 40 illustrations, \$1.50. A. C. McClurg & Co., Chicago.

WIRELESS TELEGRAPH CONSTRUCTION FOR AMATEURS—By Alfred Powell Morgan. 188 pages, 12mo, illustrated, cloth, \$1.50. D. Van Nostrand Company, New York.

CONCRETE FLOORS AND SIDEWALKS—By A. A. Houghton. No. 2 of Concrete Worker's Series. 63 pages, paper, illustrated, 50 cents. Norman W. Henley Publishing Company, New York.



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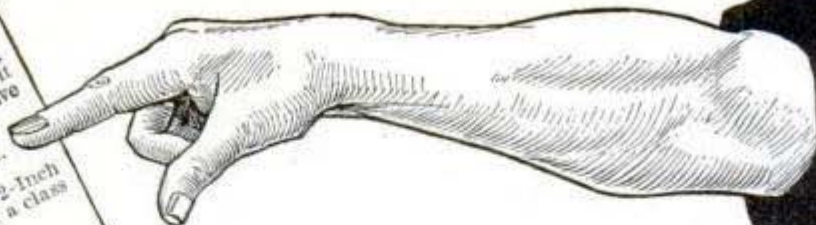
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solid, well built lathe."

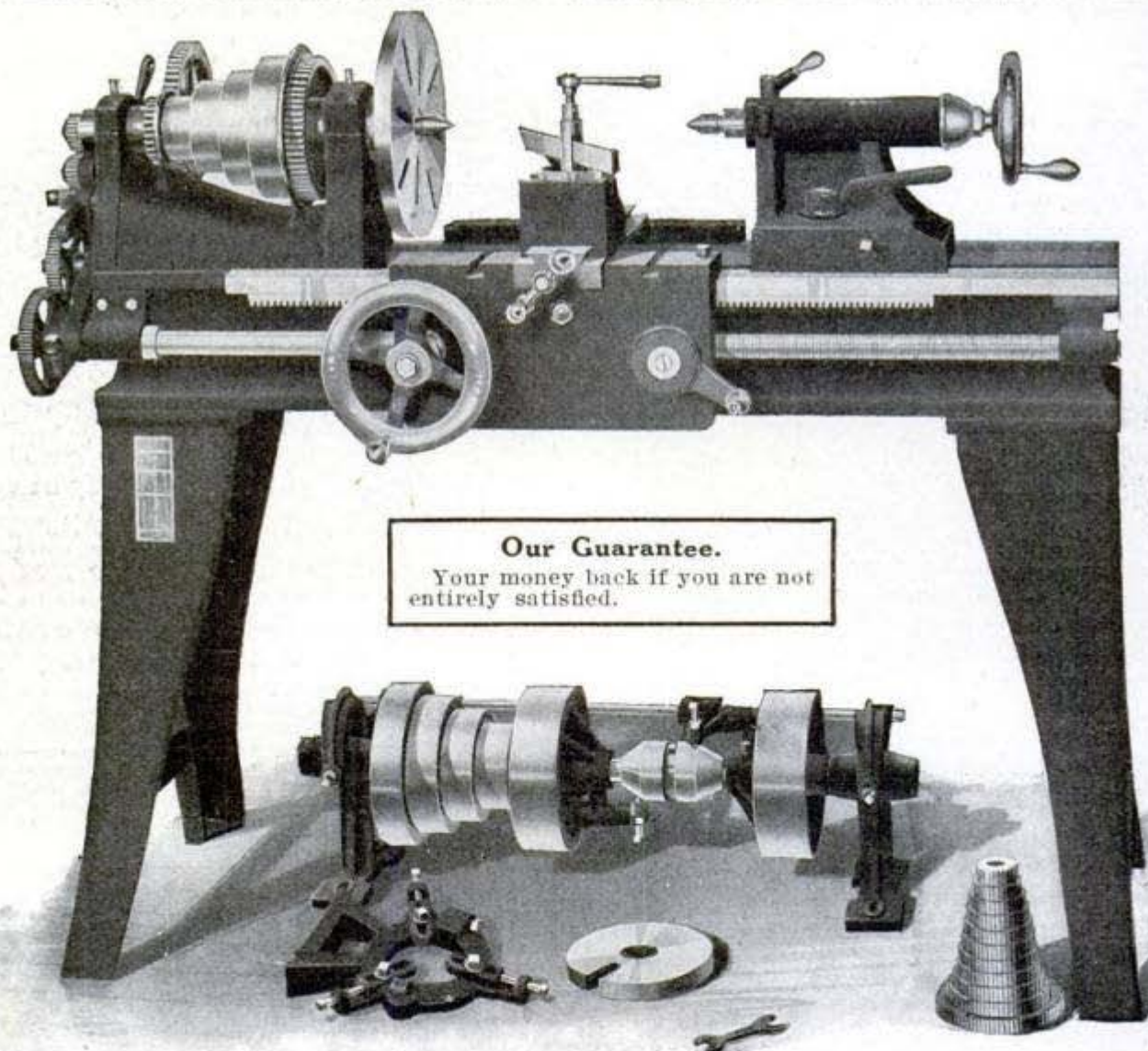
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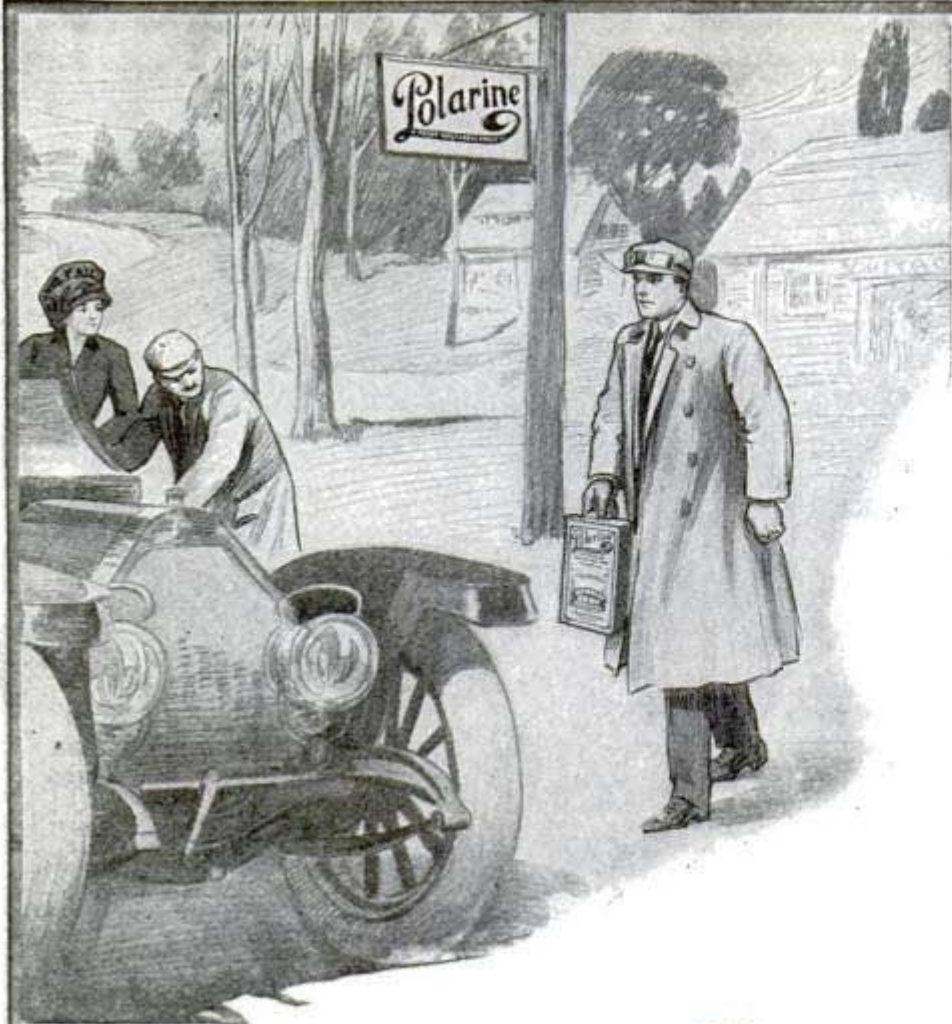
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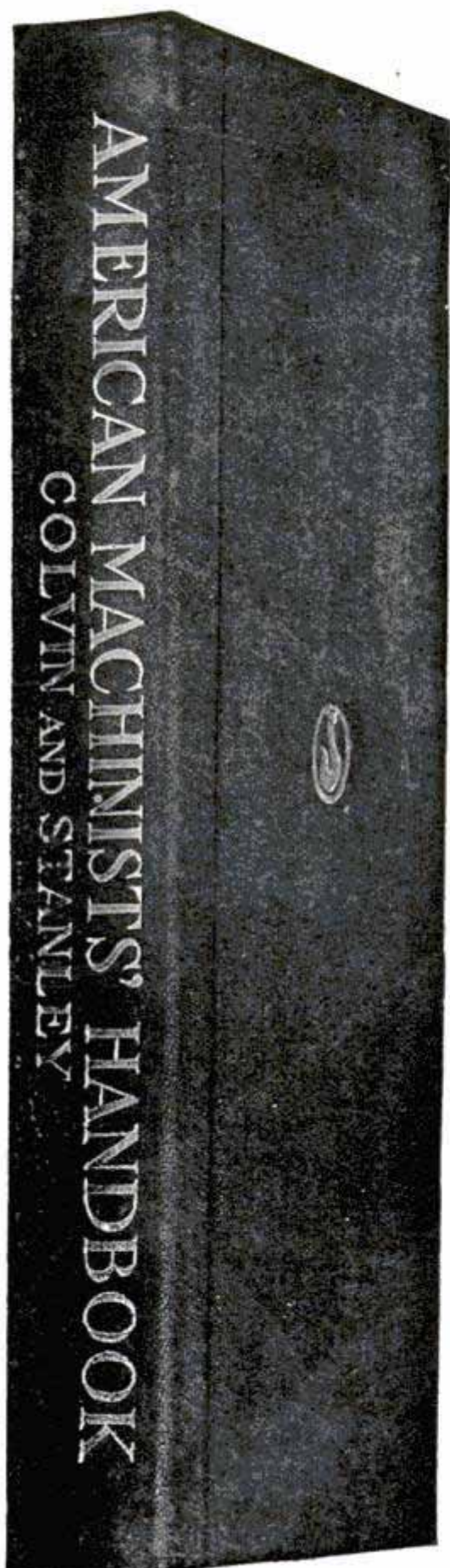
PARTIAL LIST OF CONTENTS

The entire table of contents would take up many solid pages of this size. Here are the headings of SECTIONS. Under each of these are hundreds of sub-headings:

Screw Threads. Cutting Screw Threads. Standard Proportions of Screw Threads. Measuring Screw Threads. Pipe and Pipe Threads. Twist Drills and Taps. Taps. Files. Work Benches. Soldering. Gearing. Milling and Milling Cutters. Milling Machines. Feeds and Speeds. Cam Milling. Tables for Use with the Dividing Head. Milling Cutter, Reamer and Tap Flutes. Grinding and Lapping. Grinding Wheels and Grinding. Lapping. Reamer and Cutter Grinding. Screw Machine Tools, Speeds and Feeds. Types of Tools and Their Construction. Speeds and Feeds for Screw Machine Work. Punch Press Tools. Bolts, Nuts and Screws. Table of Cap and Machine Screw Dimensions. Tables of A. S. M. E. Standard Machine Screw Dimensions. Nut and Bolt Tables. Miscellaneous Tables. Calipering and Fitting. Press and Running Fits. Dimensions of Keys and Key Seats. Tapers and Dovetails. Measuring Tapers. Tables of Standard Tapers. Shop and Drawing Room Standards. Standard Jig Parts. Tables of Dimensions of Standard Machine Parts. Miscellaneous Tools. Wire Gauges and Stock Weights. Belts and Shafting. Steel and Other Metals. General Reference Tables. Shop Trigonometry.

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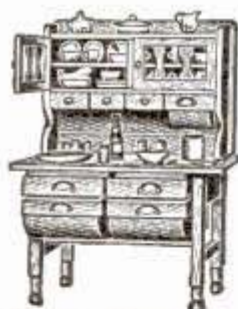
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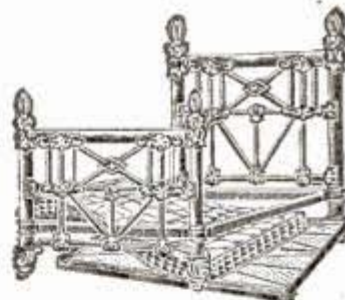
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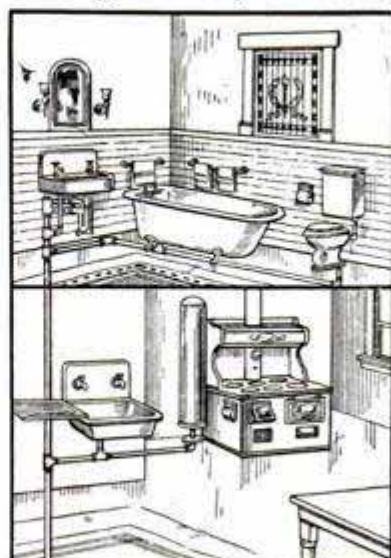
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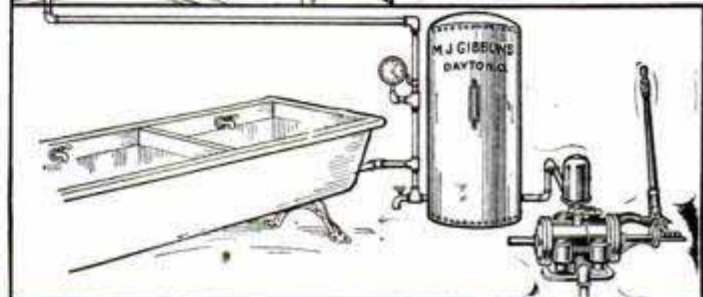
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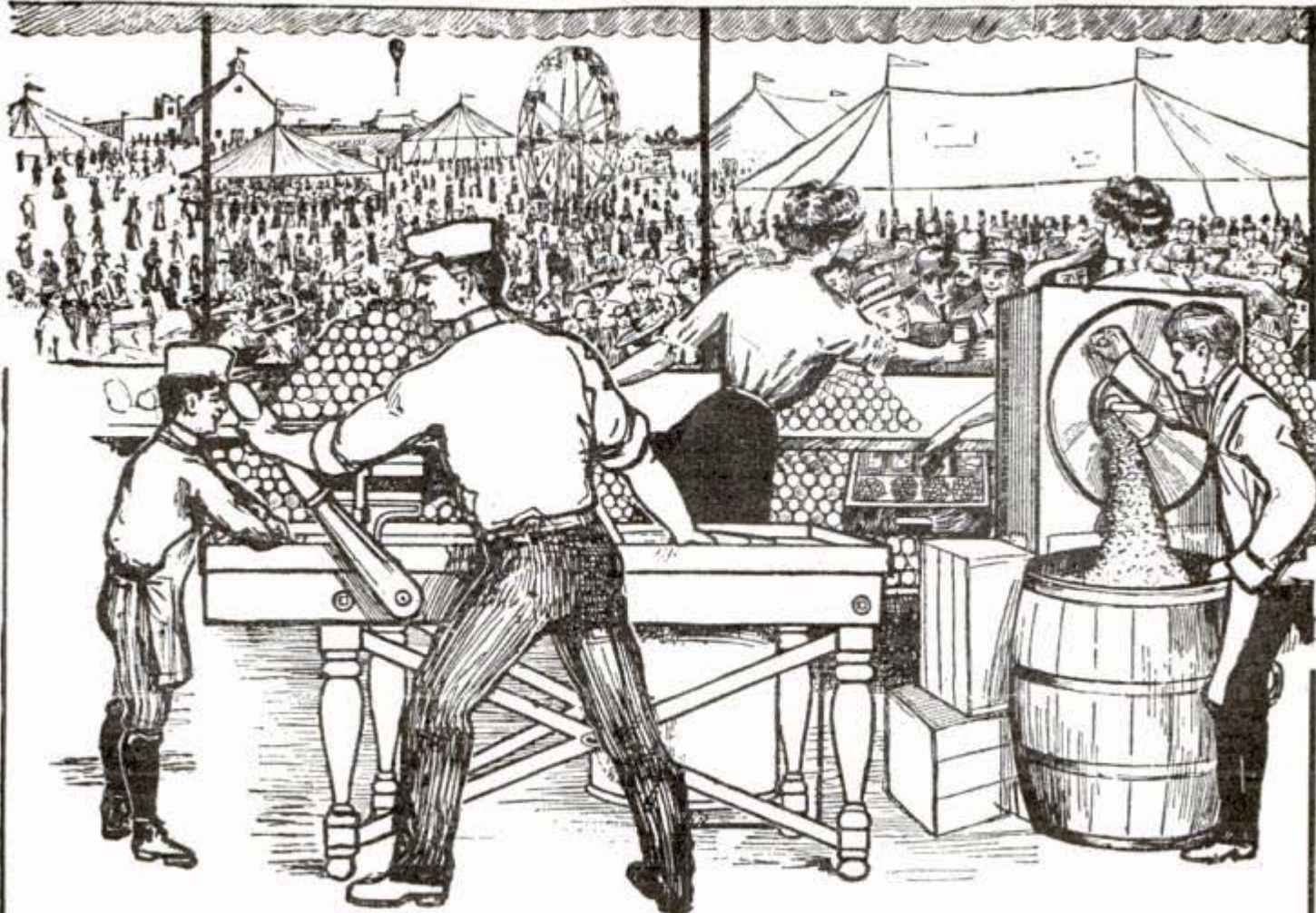
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Brads from 1/4
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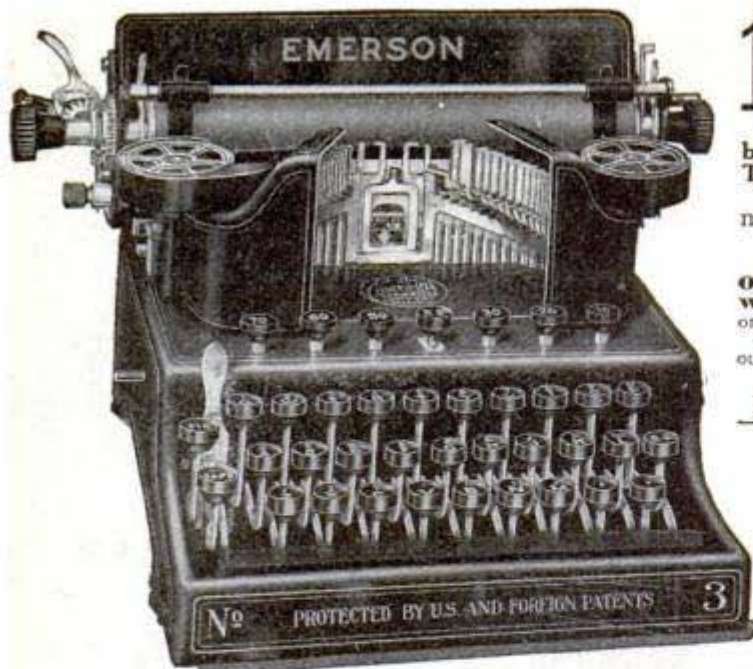


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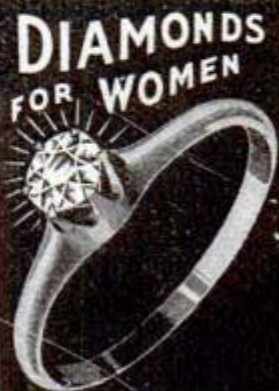
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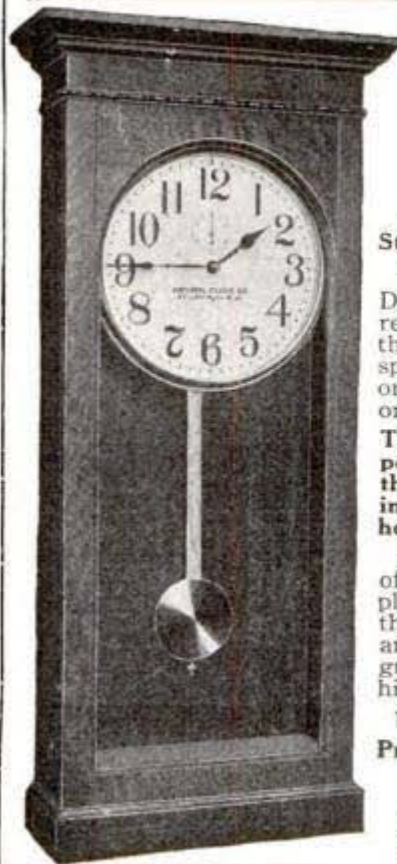


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I am the only attorney making a specialty of procuring patents in cases rejected by the Patent Office—cases where other attorneys have failed. If I report such a case patentable, I will procure the allowance of patent or make no charge for my service. Do not let a rejection of your application for patent discourage you—the Courts have held that the harder it is to procure an allowance of patent the stronger the patent is when gotten.

EXTRACTS FROM RECENT LETTERS FROM MY CLIENTS

I filed this application through another attorney, who after prosecuting it for over a year notified me it would be impossible to procure an allowance thereof; I consider the fact that you were able to procure the allowance within three weeks little less than remarkable. L. P.

Your letter notifying me of the allowance of my patent was an agreeable surprise in view of the fact that all claims on the machine had been rejected while being prosecuted by two other firms of patent attorneys, one a firm long in the patent business and having a reputation for results. C. G.

I consider the position you have taken in this matter so eminently fair that hereafter you shall receive all the business I can send you, both directly and indirectly. T. J. K.

I have received patent and want to say I am greatly surprised and pleased that you have procured this allowance without taking an appeal, and within three weeks time. This was especially surprising in view of the fact that the application was unsuccessfully prosecuted fourteen months by my former attorneys, and finally rejected by the Patent Office. H. A.

Just received my patent. The application has been in the Patent Office early two years in charge of another attorney. Since changing to you you have succeeded in pushing it through within four months and in a perfectly satisfactory manner. M. A. M.

Your prosecution of my application has been very satisfactory and the results obtained all that one could desire or expect. H. L. V.

The full context of the above and other similar letter will be sent on request.

I will be glad to meet inventors personally by appointment, and without charge, in any of the following cities: New York, Chicago, Cincinnati, Cleveland, Boston, Philadelphia, Pittsburgh and Washington, D. C.

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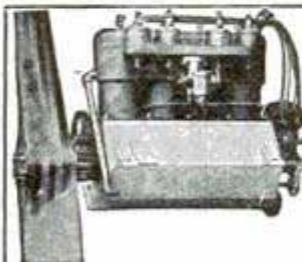
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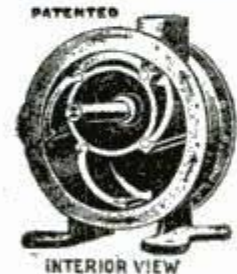
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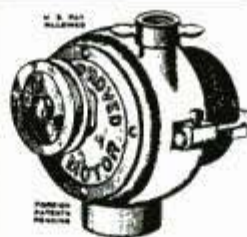
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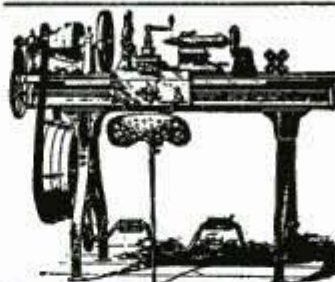
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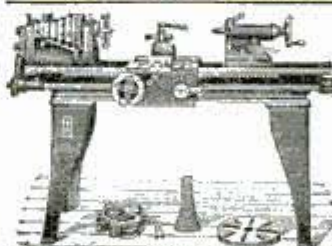
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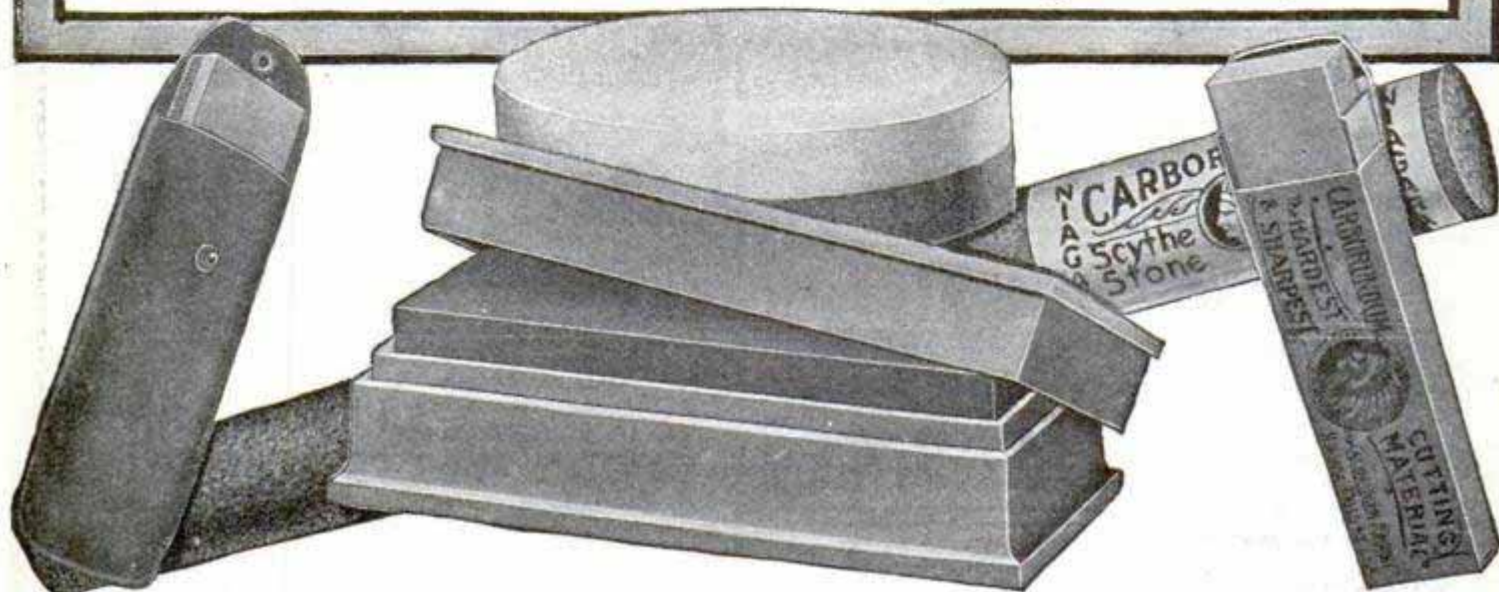
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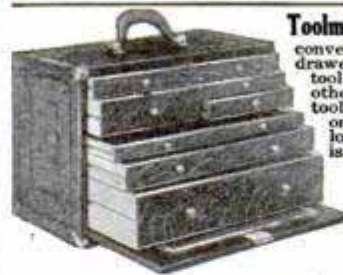
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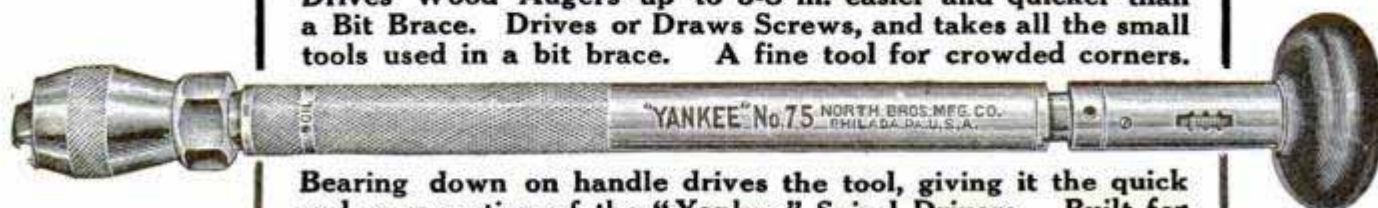
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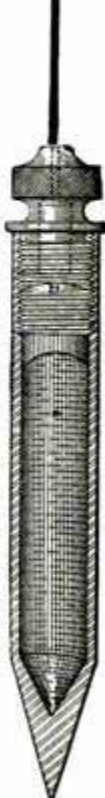
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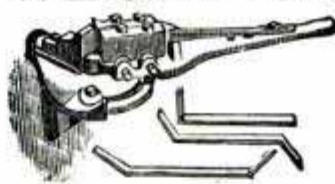
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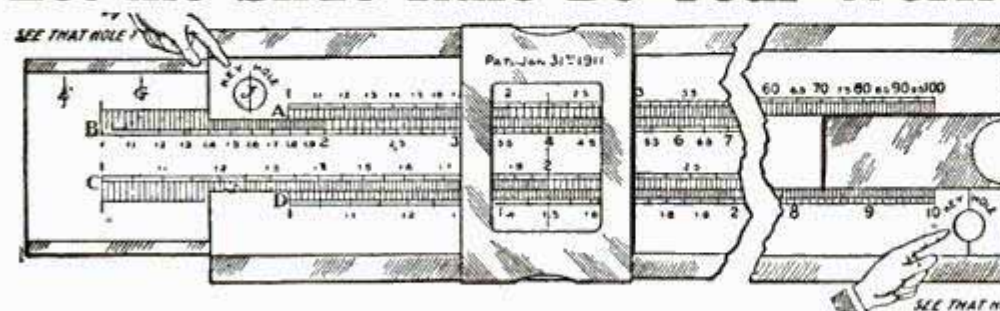
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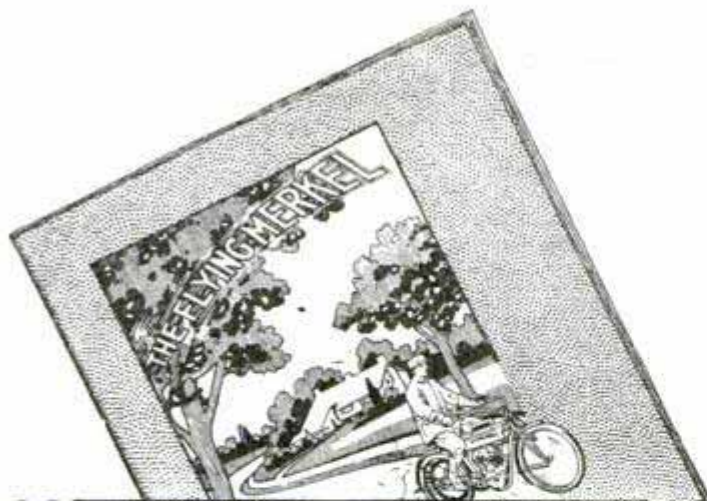
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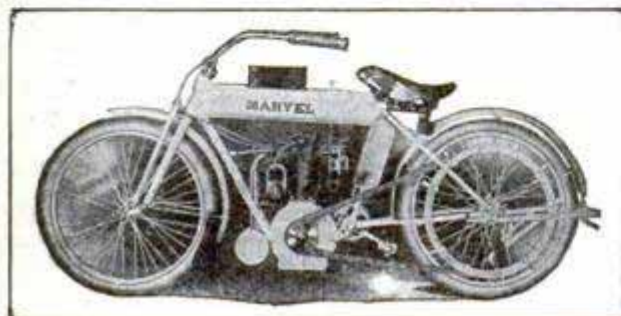


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As an introductory offer we give **30 Days' Free Trial** and prepay the freight. Hundreds of people will snap up this introducing proposition. The number of machines we sell on this liberal basis is limited—first come, first served. **Here is our plan:**—You ride the motorcycle or bicycle for 30 days. If it is not satisfactory, you may return it. If you like it, it's yours at the wholesale agents' price. The **American Motorcycles** are highest grade made, easy to start, simple to handle and powerful. You do not have to be a mechanic to run one. The American won the 1910 F. A. M. Western Endurance Contest, scoring 1000 per cent perfect. The **American Bicycles** are the best on the market. We give a **Life Guarantee**.

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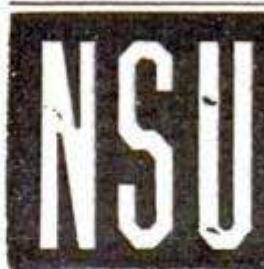
Motorcyclists!

Here are the newest motor cycle improvements. Your machine may have one or two of them, but you can not ride in such safety, comfort or satisfaction unless you have them all. Every one of them is found in the **R. S. MOTORCYCLE**. Ball Bearing Motor, Mechanically Operated Valves, Shock Absorbing Seat Post, Auxiliary Brake on Belt Rim, Foot Controlled Belt Tension Device, Adjustable Foot Rest. These and other features are the regular standard of the **R. S.** On other motorcycles they are furnished only as extras at extra prices. Write for 1911 catalog. Established dealers—write today for open territory and agency proposition.

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prepaid, to any place in the United States without a cent deposit in advance, and allow ten days free trial from the day you receive it. If it does not suit you in every way and is not all or more than we claim for it and a better bicycle than you can get anywhere else regardless of price, or if for any reason whatever you do not wish to keep it, ship it back to us at our expense for freight and you will not be out one cent.

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Won every important endurance contest last season as well as this season. Endurance is the real test of a motorcycle—because you do want absolute dependability. For 1911 we submit five very handsome models—Four (4) horse power single cylinder and one (1) seven horse power double cylinder, all described in our big booklet sent anywhere on request. "A Guide to Motorcycles."

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48-inch, Round Top, Pedestal Dining Table, extends to 72 inches, \$13.50
4 Dining Chairs, \$7.00

This sensational price is made possible by our original exclusive method of manufacturing in sections and shipping in a compact package which may be unpacked and the furniture made ready for use in thirty minutes.

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BOYS



MOTOR BOB

2 H. P.

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GASOLINE MOTOR

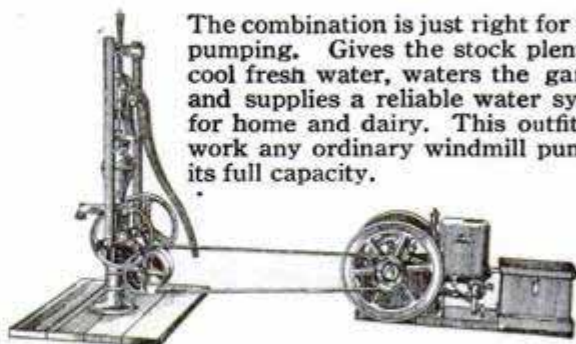
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Water—Water—Water

Just when you want it, independent of wind or weather, if you have a

"Jack Junior" Gasoline Engine and "Handy" Pump Jack



The combination is just right for farm pumping. Gives the stock plenty of cool fresh water, waters the garden, and supplies a reliable water system for home and dairy. This outfit will work any ordinary windmill pump to its full capacity.

1000 Gallons per hour on a moderate lift is easy with this outfit if your pump has that capacity.

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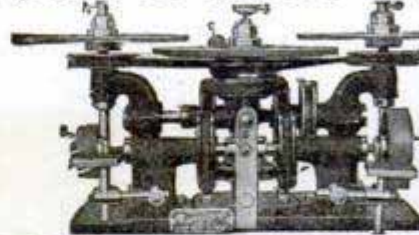
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ting on record the coming of age of his skylark.

That letter brought to light the fact that if 20 years is not exactly a common age for a lark, it is by no means a unique one. The writer has owned canaries that exceeded the 21 years of the skylark, and one bullfinch he possessed reached the age of 16 years. Exhibition or "fancy" bred birds on the other hand are comparatively short-lived, and the variety known as the "Scotch Fancy," the canary with the half-moon shaped body, is decrepit when two or three years old and is becoming extinct.—Dundas Advertiser.

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2¢ A WEEK

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Every lamp is a complete self-contained miniature light works.

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THE "BEST" LIGHT.

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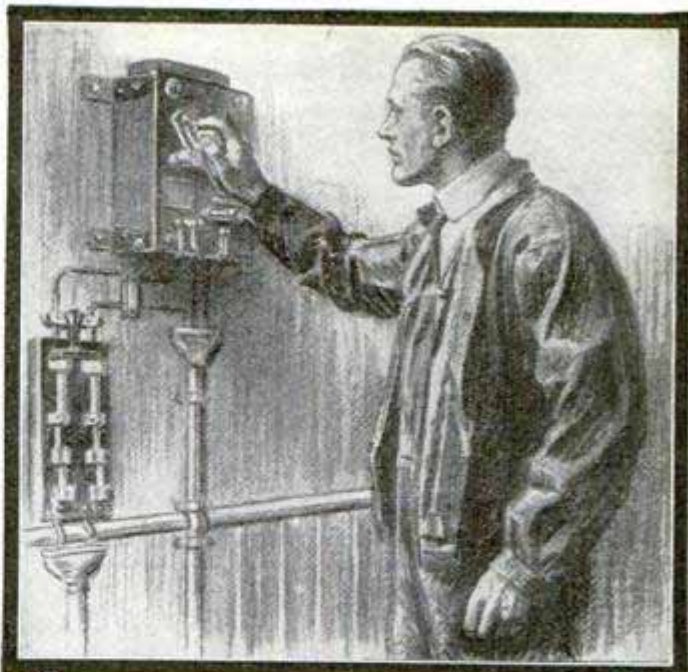
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It lights instantly. As convenient as electricity at one-tenth the cost. So simple anyone can operate. For further particulars and Agency, address

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A 300 Candle Power Lamp, steady as daylight, for Home, Store, Shop, work bench, library, desk, or wherever a steady and powerful light is wanted or stand lamp can be used. Can be turned up and down like gas, and carried around with more safety than a kerosene lamp, and gives 10 times the light at less than 1/4 the cost to operate, which a child can do. Better than gas or electric lamps because there is no hose or drop wire to prevent their being moved or used anywhere. Bright nickel finish, height 25 inches, holds 2 quarts of gasoline, always ice cool and one filling lasts 20 hours. It has no competitor.

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Costs but little and will last for years. Weight only 15 pounds. Requires but little water, and no plumbing necessary. Folds into small roll and no more trouble to carry than a valise. Enjoy the delights of a full length bath in your private room. Far superior to a tin tub. Write for description and special offer to agents. **ROBINSON MFG. CO., 654 Jefferson Ave., Toledo, Ohio, Mfrs Turkish Bath Cabinets.**

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Send now for my non-magnetic watch, only \$5.00 (delivered). This watch will positively withstand all magnetic attractions. Tested to 2000 volts, absolutely guaranteed to keep the most accurate time under all conditions. Approved by everybody in the Electrical Industry. Stem wind and set; dust proof; thin model.

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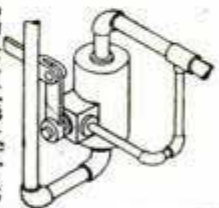
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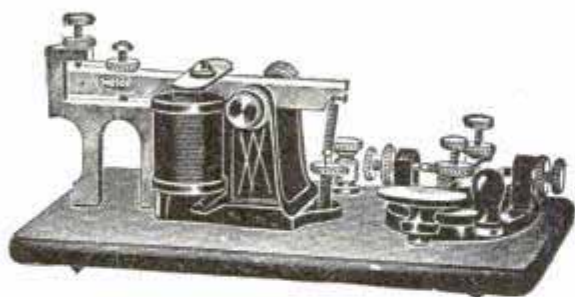
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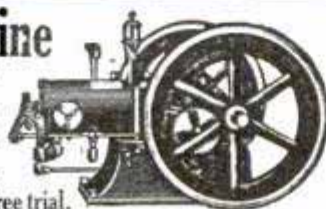
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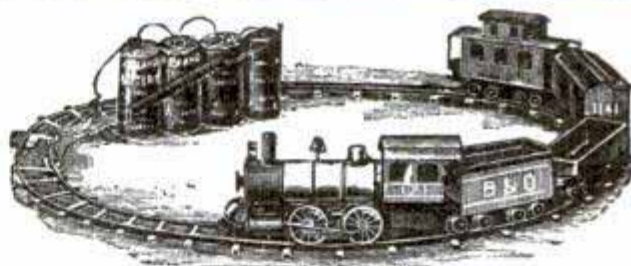
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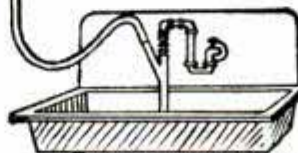
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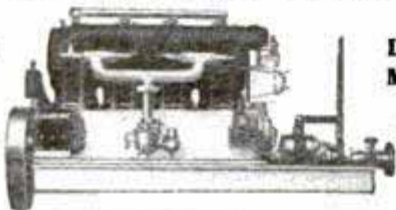
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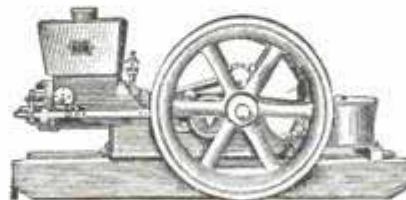
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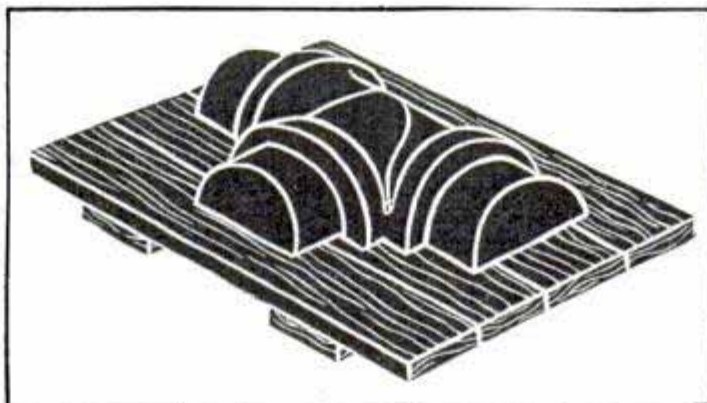
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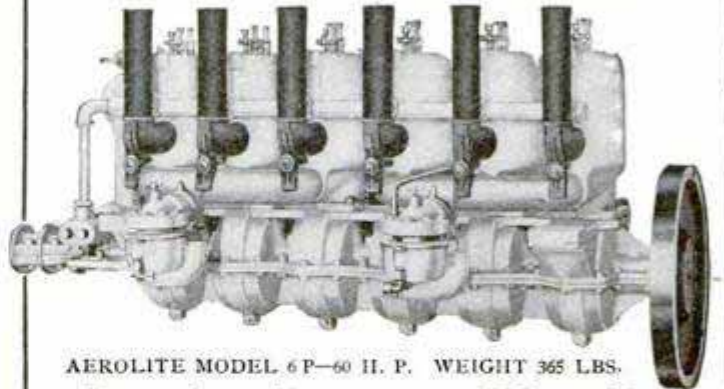
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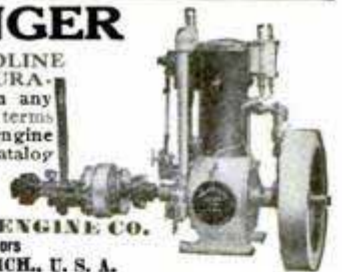
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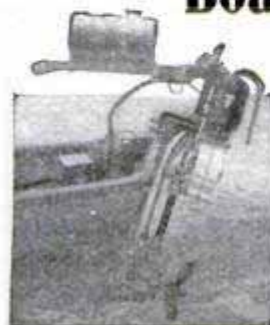
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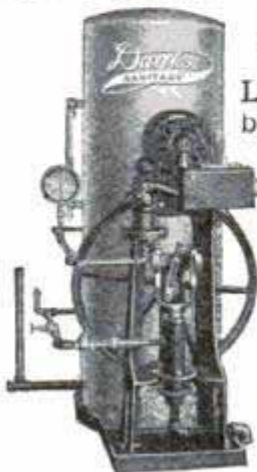
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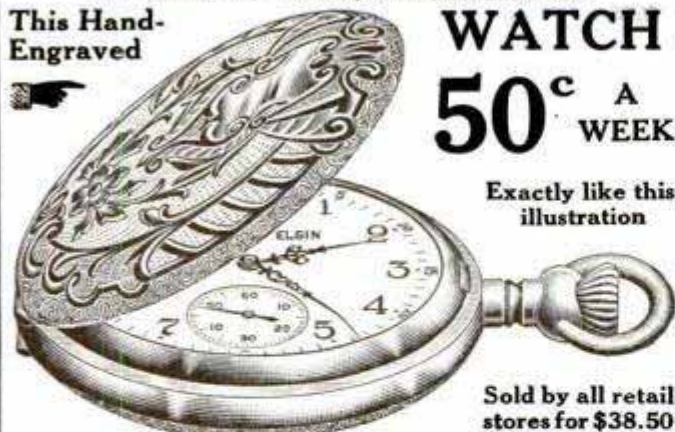
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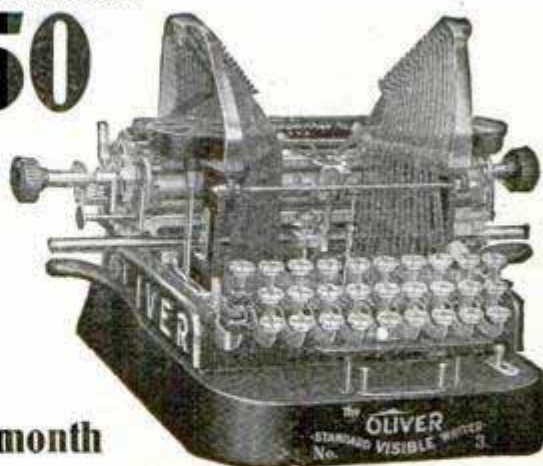
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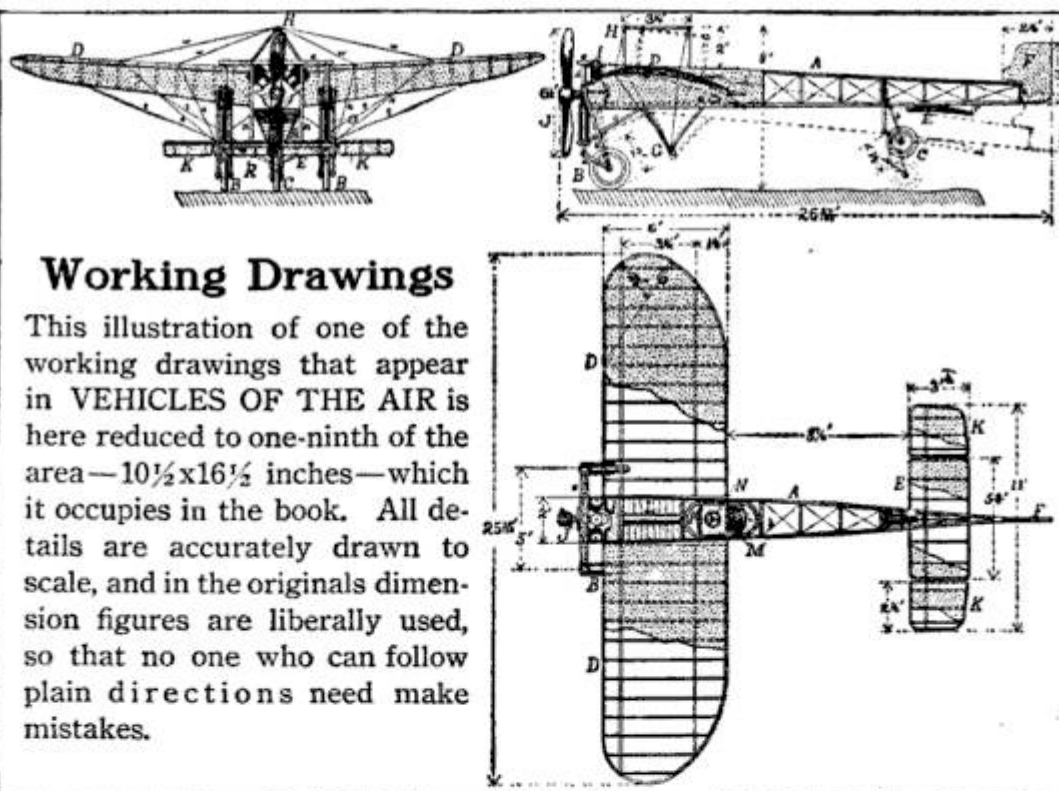
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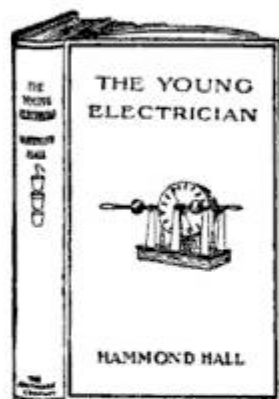
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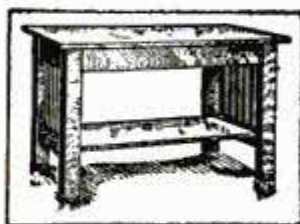
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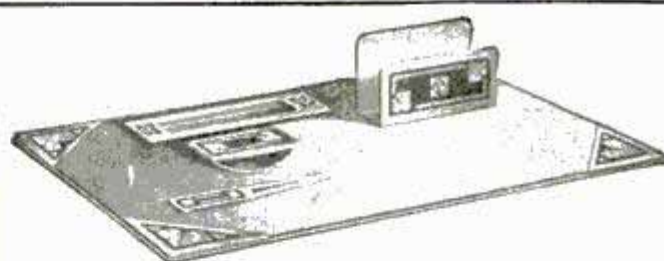
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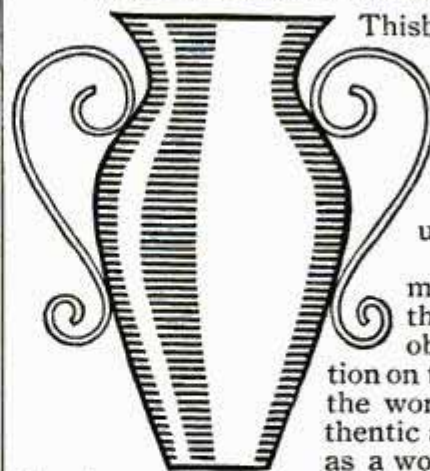
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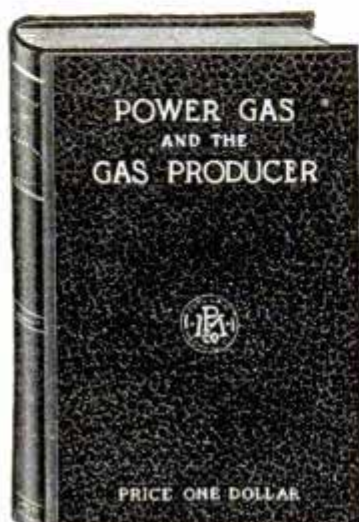
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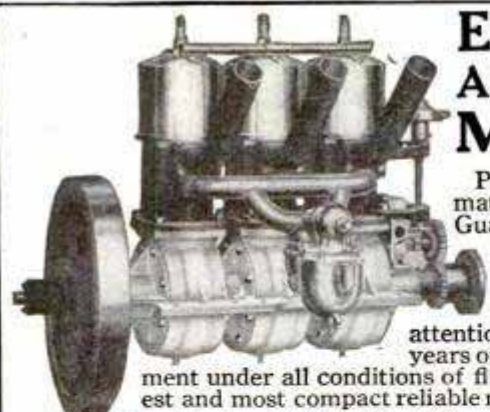
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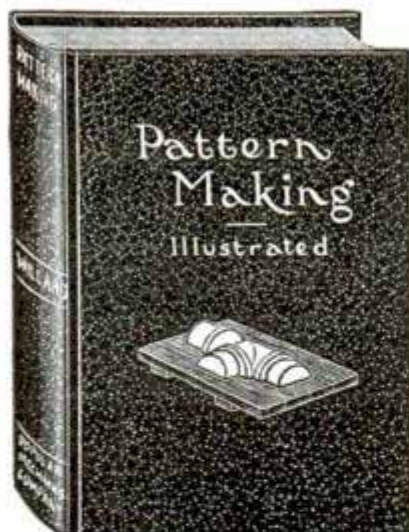
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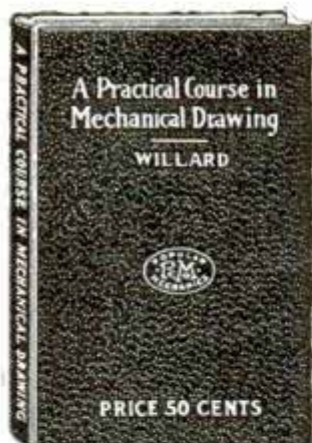
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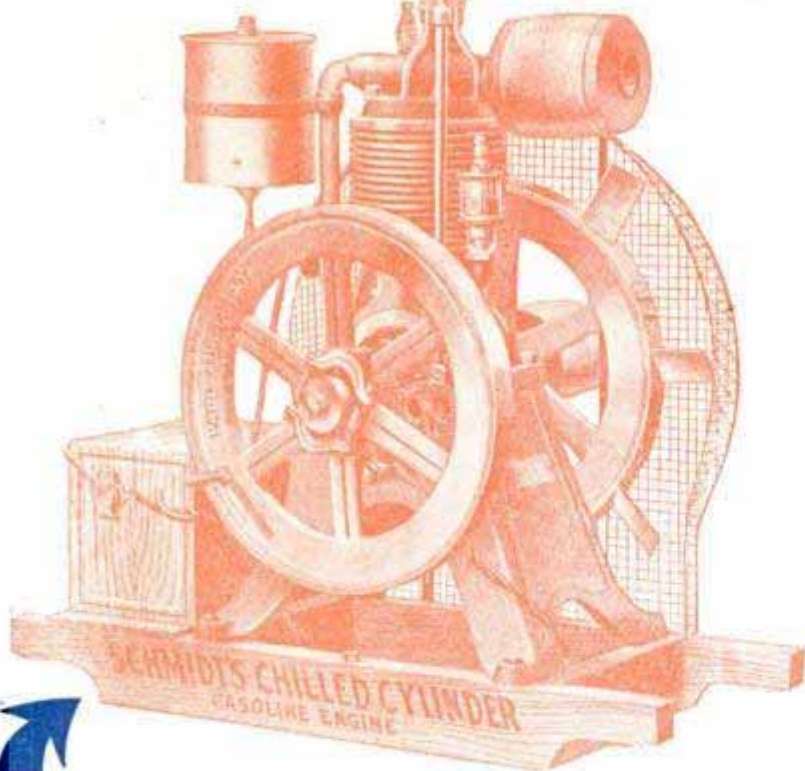
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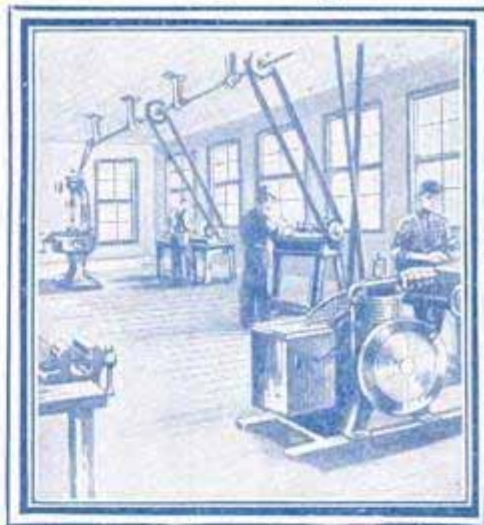
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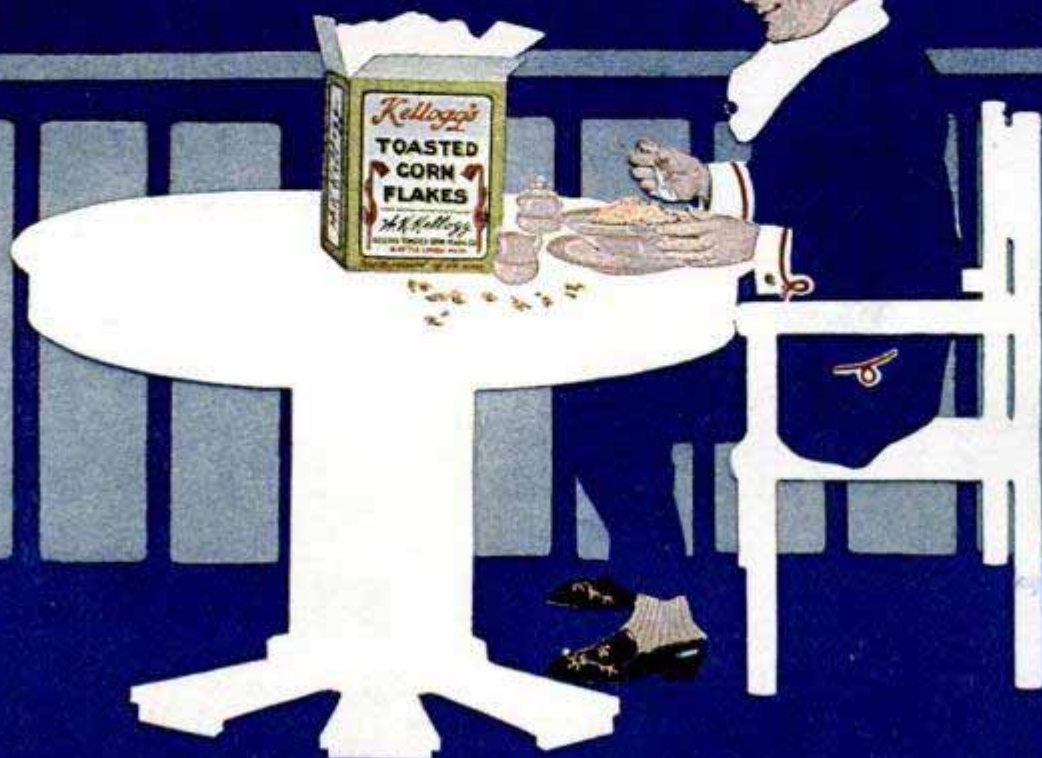
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